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ABSTRACT

This report by National Goals Research Staff, established by President Nixon, is designed not as a listing of specific national goals to be sought but as a springboard for discussion and an aid to decision. It does not presume to say what our choices should be. Rather, it defines the questions, analyzes the debates, and examines the alternative sets of consequences concerning: population growth and distribution; environment; education; basic natural science; technology assessment; consumerism; and, economic choice and balanced growth. It is preceded by two other Federally sponsored Goals Reports produced since 1960: "Goals for Americans", 1960, the report of President Eisenhower's Commission on National Goals; and "Toward a Social Report", (SO 001 841) sponsored by the Department of Health, Education and Welfare, 1969.
(Author/VLW)

A REPORT

# Toward Balanced Growth:
# QUANTITY *with* QUALITY

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**July 4, 1970**

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ON

# TOWARD BALANCED GROWTH: QUANTITY WITH QUALITY

Report of the
National Goals Research Staff

SP 001 938

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THE WHITE HOUSE

WASHINGTON

July 4, 1970

Dear Mr. President:

In your statement of July 13, 1969, establishing within the White House a National Goals Research Staff, you called for "a public report to be delivered by July 4."

I have the privilege of transmitting to you the report of that staff entitled, "Toward Balanced Growth: Quantity with Quality."

Sincerely,

Leonard Garment

Leonard Garment
Director
National Goals Research Staff

The President
The White House
Washington, D. C. 20500

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## Counsellor's Statement

## COUNSELLOR'S STATEMENT

**Daniel P. Moynihan**

It has never been the purpose of the American people simply to get by, hopefully with as little misfortune as possible. From the outset of our life as a people, and then as a nation, we have purposed great things, and have achieved many. Not least because we have expected to do so. (Might it not be asked what other nation would undertake to send three men to the moon, and in the full expectation that they would get there and return safely, have its chief executive await them on the deck of a warship in waters half round the world from the seat of government? The only other nation even to begin the venture does so in the utmost secrecy, presumably anticipating disasters. For what else should be expected from such a presumption? Perhaps the difference is to be found in the term "presumption." Going to the moon for Americans was not tempting the gods, far less defying them. Was it not, rather, a collaboration? Apollo's teammates indeed!)

A nation that undertakes to do great things will of necessity much of the time be dissatisfied with its performance. There is a deep running reason for this that is in every sense a good reason. It is as Walt Whitman wrote: "It is provided in the essence of things that from any fruition of success, no matter what, shall come forth something to make a greater struggle necessary." There is a less reassuring reason also. Great efforts can and do lead to great disasters. A law of proportionality obtains in the affairs of men. He who would make no little plans must expect to make no small mistakes.

All the more, then, is the likely value of a regular, recurring effort to assess just where the Nation appears to have got with respect to goals it has undertaken, and just where we are likely to get accordingly as we choose one set of apparent options over another. There is only one thing more useful than being reminded that a national commitment has not been kept, and that is being reminded that it has. There is a danger of pridefulness in the goals America sets for itself, and the role it seeks to play in the world. But there is a perhaps even greater danger of despair. The reasons for this are simple enough. Human achievement is difficult, is rare, and is often as not fleeting. In an age whose most distinctive feature

is technological achievement this might not at first seem to be the case. Even so, it is. Technology transforms the relationship of man to his natural environment, making it easier to do things he has sought to do in the past, and possible to consider other things heretofore undreamed of. But that same technology makes the relationships of men to each other more difficult, or at least not less so, and assuredly more subject to peril and risk, and to the constant need for re-creation.

There is a rising perception of this reality in the United States, and it may be expected to follow in other industrial nations as well. It perhaps explains the curiously foreshortened nature of the response to the flight of Apollo XI. Pride in the men who did it was intense, but their success did not set off any great cycle of national self-congratulation. Rather the contrary. As often as not, success in space was cited as grounds for intense dissatisfaction with the state of affairs on earth. Why, it was asked to the point of intense unoriginality, was it that our Nation could land men on the moon, but could not "clean up the mess in the cities"? At least a partial answer is that two quite different problems are involved. Getting to the moon involves men overcoming a struggle with certain gravitational forces. Those not involved in the struggle are neutral in it. The condition of the cities—or the countryside, or the suburbs, or whatever—involves situations in which men have, or think they have, conflicting interests, and act in ways to thwart one another just as often as they act in concert to achieve some common end. (This is perhaps an exaggeration. The overwhelming fact of urban life is the degree of seemingly effortless cooperation about most things. The areas of conflict are comparatively small, but in the nature of things it is these that command attention. If the supplying of water were as chancy, as contentious, and as recurrently unsuccessful as programs to ensure the safety of the citizen on the streets at night, there would be considerable talk about the water crisis.)

It is nonetheless a fact that as technology advances, man's initial fascination with, and confidence in, it recedes. This may or may not be a cyclical process. In any event, such a recession is powerfully in evidence in the United States today, and most especially among those persons who have most benefitted from that technology in terms of material well being. Beyond technology, this mood increasingly is directed toward science itself. Knowledge for the moment is at a discount in the United States, the result of the unforeseen consequences of the use of knowledge, and not less frequently, of the presumption of knowledge where none existed. (The latter being perhaps a characteristic weakness of a civilization in which so much *is* known. It becomes difficult to admit to ignorance, and easy to assume the reliability of information that is anything but reliable.

A 19th-century American saying held that "it's not ignorance that hurts so much as knowing all those things that ain't so." We have been more than a little hurt, of late, by that phenomenon, and this too has deepened the sense of underachievement, or even of failure, that is much to be encountered at this moment.)

All in all, the circumstances of the moment are not those that in the past have quickened the national desire for more comprehensive collecting and sorting out of social data. The test of social reporting is not whether it seems like a good idea in cheerful times when the future presents itself as an all but irresistible opportunity for benevolent manipulation. The test comes in times of stress when intelligent, if perhaps overwrought, men will be found asserting that the main question about the future is whether there will be one. It is at such moments that information counts. This is such a moment. If social reporting is to play a role in American governance, this is the time to find it out.

The hoped-for nature of that role should be made explicit now, as it was at the time the National Goals Research Staff was established. The NGRS was not to be a planning agency, nor was it in any way to usurp or replace the processes of decisionmaking within the executive branch of Government. Much less was it to assume the functions of any other branch or level of government. Rather, it was to provide information and analysis so that those making decisions might have a better idea of the direction in which events are moving, the seeming pace of those movements, and alternative directions and speeds that possibly could be achieved were policies to be shifted in one direction or another.

The continuity of the idea of a social report has been emphasized by many. It may at this point be well to note that the idea has also evolved in response to changes elsewhere, primarily with respect to the concept of public policy. We are moving from program to policy-oriented government. It would be proper to ask who made that decision. The answer would have to be no one. Whereupon the question would arise as to whether any decision had really been made, or any development had actually occurred, and even here a defensible response would have to be cautious, even to the point of evasiveness. Nonetheless a distinctive shift in outlook and process is to be encountered within the Federal Government which relates to the distinction between program and policy, and represents a shift in emphasis from the former to the latter.

A distinction between the two concepts can be made at varying levels of complexity, but the most elemental is the most useful. Government, for the most part, is a collection of programs. A program is an activity of some kind authorized or required by statute. The objectives of the program may nominally be stated in large, general terms, but, in practice, programs are defined as activities of certain kinds which are their

own justification. In terms of the social system, programs represent "inputs": so many miles of highway; so many square miles more, or less of national forest; so many Headstart classes; so many acres of price-supported crops; so many dams; so many manpower training "slots"; so many silver dollars. The assumption on which programs are based is that the inputs which they constitute lead to certain desired outputs of the system. More highways mean more convenient travel; more manpower training programs mean more and better employment; more silver dollars mean better living standards for certain areas of the Nation. As a first approximation, most of these assumptions are certainly reasonable, and usually valid.

At times, programs do exactly what they purport to do. The difficulty comes with more complex analysis. Altogether too frequently it will be found that the actual results of a program are not at all what was hoped for or promised. More dams may not produce more flood control; more price support may not produce more prosperous family farms. Still more frequently, it will be found that the desired results of a given program in the area to which it is directed produce quite undesirable results in another area that was either presumed not to be related, or was not thought to be related in any significant way. Thus more convenient travel may lead to barely tolerable, even intolerable levels of air pollution. The "successful" manipulation of natural processes in one part of the ecology, may lead to altogether unacceptable distortions in another part of the system. Thus, policy is primarily concerned with the "outputs" of a given system.

The key term here, of course, is system. The idea of policy arises from the recognition that the social system is just that, a system. Once this fact is recognized there is no alternative save to act in accord with it. That is to say, the object of policy is to guide government activities in accordance with the properties of a system.

The first of these properties is the best known. In a system, everything relates to everything. If one part is changed, all other parts are affected. It thus becomes necessary to think of the total effect, not just the partial one.

This fact has an important corollary. Given the interconnections of things, it follows that there is no significant aspect of national life about which there is not likely to be a rather significant national policy. It may be a *hidden* policy. No one may know about it; no one may have intended it. But it is a policy withal. (In the course of the 1960's, for example, the Selective Service System emerged as a national youth policy of pervasive, enormous, and, in almost every respect, calamitous consequence. In effect, the draft meant that youth of higher social status would

in considerable measure be excused from fighting in a difficult and dangerous war. Almost certainly this contributed importantly to a sequence of events which led large numbers of this group into unprecedented opposition to society as a whole. Yet Selective Service was never seen as a youth policy. From the first it has but one object, to maintain the Armed Forces at a lesser cost than would be required if the members thereof had to be induced to serve by the same kind of inducements that operate in the labor market generally. Not infrequently, the strongest proponents of the draft have been persons who wished to see the money "saved" by it used for important social services to help the less advantaged. They certainly never considered that in the process they might be sending just such persons to war, while exempting more privileged youth.)

A second property of systems can be seen at work in the foregoing example. Systems are frequently "counterintuitive" in their operation. That is to say, common sense expectations as to what will follow from a given intervention are frequently wrong. Thus by the end of the 1960's it was not persons who were being drafted who appeared most to protest the draft. Rather it was persons who for various reasons were exempted or deferred. On closer examination it may be there is a perfectly reasonable explanation for this, but the term "counterintuitive" is not intended to be mysterious. It is nothing unusual in personal experience for things not to work out as expected. This is not less true of government activity. But it is within the power of government—that is to say the power of systematic analysis—to detect such situations more frequently than will be the case when men simply rely on their hunches. (This power, to be sure, is limited. After two decades of urban renewal, the argument still goes on whether the results of the program have been to increase the supply of low income housing, or to decrease it.)

To repeat, somewhat, knowing these things to be so, responsible government must act accordingly. It is in this sense that the movement away from program-oriented government toward policy orientedness is at once a manifest, almost visible, phenomenon, and yet is largely unofficial, even informal. It may be likened to a change in sensibility in cultural matters. A time comes when persons see things differently from the past, and, accordingly, act differently.

Like any change in the style and substance of government, this most recent one involves problems for democracy. Tracing the complex and involute interconnections by which inputs produce outputs in a large social system is not the work of amateurs. It is not now done in any area of social policy save in economics, and there, most economists would insist, it is done imperfectly. It is not done elsewhere because no one really knows how to do it. It is just that most persons who have considered the matter feel it has to be done, and accordingly someone will have to learn

how. Many someones. It will be necessary to develop a career civil service capable of dealing with the subject matter. (And this will require the development in universities and elsewhere of policy disciplines.) It will be necessary for political executives to learn to use the information produced by these disciplines. (This process may already have begun. The Equal Education Opportunity Survey, commissioned by section 410 of the Civil Rights Act of 1965, and completed in 1966, produced massive amounts of "counterintuitive" information about the workings of the educational system. At first the government had difficulty responding. The information was either ignored or distorted. This response did not persist however. Gradually, government learned how to use the new findings. On May 21, 1970, President Nixon sent to Congress a message on school desegregation, the educational strategy of which was based primarily on the findings of the EEOS with respect to the fundamental importance of social class and racial integration to raising the educational achievement of children who do less well than they should.)

If the analysis and discussion of public issues is to continue to move in this new direction, it becomes necessary to lay down certain principles which ought to guide all of those involved if the end result is to be a more creative democracy, and not simply a more effective government. It is not for any one person or administration to assert what those guidelines ought to be, but there is likely to be a fair consensus that high on any such list would be the principles of participation, and of accountability.

Participation is the first principle of democracy. It developed relatively late in Western political thought—principles of liberty, of civil rights, clearly antecede it—but has surely proved enormously powerful and effective. Part of the evidence for such a statement is that the Western democracies, perhaps especially the American democracy, seem continually to be evolving new forms of participation by citizens in the governing process, gradually transforming experimental, ad hoc practices into more or less routinely acknowledged rights. From earlier forms of representative democracy there has been a fairly steady evolution toward direct citizen participation in the actual workings of government, a movement that has somewhat lagged but otherwise paralleled the increasing professionalization of government service. One result of this is that, in the long perspective, the second half of the 20th century will almost certainly be seen as a period during which bureaucracies became more, not less, accessible to outside influences exercised by citizens purporting, at least, to be representative, and often as not, being such.

If this evolving concept of participation is to persist, and to have genuine consequences, that is to say, results which raise rather than lower the general sense of the propriety of things, it is essential that the public

increasingly be provided *in advance* with the essential data on which basic decisions about public policy are made. This situation is already well developed with respect to basic economic data. If it will be recalled that the Nation went through the whole of the great depression of the 1930's without ever really knowing the unemployment rate (which at that time was recorded every 10 years by the Bureau of the Census), the extraordinary advances of the postwar period become evident. It is a good general rule that governments only begin to do something about problems when they learn to measure them. It is perhaps even more important to be clear that peoples are only likely to take serious advantage of opportunities when they learn to recognize them. In this respect, the development of the national income accounts, which parallels that of employment data, has for the first time made it possible to speak in serious and specific terms about the opportunities which economic growth will present in the foreseeable future. Consider the implications of the following paragraphs from the President's 1970 state of the Union message:

> As we move into the decade of the seventies, we have the greatest opportunity for progress at home of any people in world history.
>
> Our Gross National Product will increase by $500 billion in the next 10 years. This increase alone is greater than the entire growth of the American economy from 1790 to 1950.

Documents such as this report can become one of the essential channels by which the options before the Nation are presented in specific and comprehensible terms so that it becomes possible for a body of public opinion to form in advance of the time when government does or does not make decisions about which directions to move. (Note particularly that a decision to do nothing is very much a decision.) In the past, having had so little understanding of what our options might be, most decisions have gone by default in this negative fashion. The great power of social data is to inform us as to what possibilities may exist.

Social data also become indispensable to meeting the principle of accountability. There is no serious way for the Nation to know whether the options chosen by the governmental process are in fact attained unless there is a steady, readily accessible, and understandable flow of information as to the actual results, which is to say the outputs, of government programs. In this respect, one of the most important legislative measures in American history was the Budget and Accounting Act of June 10, 1921, which established the Bureau of the Budget and the General Accounting Office. From that time forward the auditing practices of the Federal Government became steadily more efficient, and

just as importantly, more accessible to the public. It has been remarked that thereafter public funds might be wasted, but they were rarely stolen. The result was a steadily higher confidence in the probity of Government activities, and a correspondingly increased willingness on the part of the general public to see Government undertake ever more ambitious and promising efforts. As Government moves toward the more or less conscious adoption of policies with respect to large national issues such as economic growth and regional development, population, racial equality, environmental stability, and any number of similar issues, it clearly becomes necessary for there to be more or less readily available measure of the "outputs," that is to say the results of such policies.

There is an important further sense in which the availability of authoritative data on social trends is likely to be increasingly important in the period ahead. If it is a condition of life that a great many problems develop unawares, and that other problems are ignored even where warning signals occur, it is not less a condition of the present time at least that a great many situations are utterly exaggerated in the opposite direction. If man is a problem-solving animal, American men and women are problem collectors as well. Particularly in the present atmosphere of rejection by many persons of the past routines of science and technology, it becomes possible to represent thoroughly manageable trends in areas such as environmental change or population growth as wildly destructive and uncontrolled rampages leading mankind to the imminent abyss. Such prognoses invariably are set forth in the name of some common good, some shared interest in the avoidance of disaster, yet here, as in most matters, Americans tend to pursue rather special, personal interests: as much today as when President Madison outlined this process as one of the conditions to be contained by the democratic process, and of course about as much and no more than do any other people.

There is every reason to be concerned about the costs of economic growth, and need for a balanced national growth policy, as the President proposed in his 1970 state of the Union message. But this is quite a different thing from proclaiming the immediate necessity to put an end to growth. Such an idea might be attractive to families with incomes over $50,000 per year. But how much sense would it make to the 24.3 million persons who live below the poverty line, or for that matter to the great mass of the American people who live good lives, but hardly lavish ones? In much more general terms, how much sense would this make for society, given the great stabilizing role of economic growth which makes it possible to increase the incomes of less well off groups in the population without having to decrease the incomes of others? Even so, the Nation could easily opt for such a course in the absence of credible and

comprehensible information as to just what is going on, and what trends are likely to be.

The perils of choosing national goals on the basis of inadequate or misinterpreted information are surely matched by the dangers that arise when progress toward national goals that have already been chosen is assessed on a similarly inadequate basis. The difficulty with national goals is that they too quickly become standards by which to judge not the future but the present. In a sense, they institutionalize the creation of discontent. The setting of future goals, no matter how distant, drains legitimacy from present conditions. Once it is established and agreed upon that the future will have to be very different from the present, it becomes absurd to be content with the present. The past is annihilated. The most extraordinary progress counts for little if it has brought society only to a middling point in an uncompleted journey.

Yet the creation of discontent is in part the object of goal setting. Discontent is commonly a condition of creativity in an individual or a society: it is at all events an immensely useful spur to progress. The art of national goal setting, then, is to be realistic about what can be attained, and to use social data in such a way as to enable both the expert and lay publics to understand that progress toward any seriously difficult goal is going to take place by increments, and to measure that progress as it occurs (or fails to occur, which is often the case).

The most distinctive success in an effort of this kind has concerned the Employment Act of 1946 which set forth the national goal of promoting "maximum employment, production, and purchasing power." This undertaking was somewhat preceded and very much followed by an intensive and brilliantly successful effort to develop employment and income accounts which would make it possible to measure the Nation's approach to the somewhat attenuated goal set forth in the statute. Given the cyclical nature of much economic activity, periods of movement toward a high level of employment have alternated with periods of movement away from that condition, but *by and large* over the intervening quarter century the Nation has learned a good deal more about how actually to attain that goal, and has achieved a much stronger consensus that it ought to be attained.

The two areas of conspicuous failure have involved young workers and black workers, but even here changes are occurring in the direction of the Employment Act. Youth unemployment rates have risen sharply from those of the mid-1940's. The reasons for this are disputed, but certainly include declining rates of farm employment, and higher levels of youth wages, both of which represent improved income positions for those with jobs. The situation had nonetheless become intolerable by the 1960's, and a range of more or less permanent youth-employment programs were

instituted. If they have not achieved the goals of the 1946 act, they certainly suggest that the Nation would be even worse off in this particular respect had not the existence of those goals added to the presumption of the necessity and normality of the responding programs. Similarly, in the period following the adoption of the Employment Act the position of black workers worsened with respect to that of white. A 2-to-1 ratio of unemployment rates was for 15 years a seemingly fixed feature of the economy. But this in turn hastened the adoption of programs in the 1960's heavily directed toward the problems of Negro employment. Moreover, at the very end of that decade the 2-to-1 ratio began to diminish. How permanent this change will be no one would yet want to predict, but again the fact is that accurate social data have made possible an increasingly informed and effective national debate on the achievement of the national goal of "maximum employment, production, and purchasing power."

In 1964, almost two decades after Congress adopted the national goals of the Employment Act, the Economic Opportunity Act went beyond the "maximizing" standards of the earlier legislation to proclaim the absolute goal "to eliminate the paradox of poverty in the midst of plenty in this Nation. . . ." The Economic Opportunity Act proclaimed this goal and a wide range of further legislative enactments set out to attain it. In statistical terms, there has been a remarkable success. During the first half of the 1960's there was very little decline in poverty, as measured by the subsequent Social Security Administration index. The number of Negro poor actually rose during 1960, 1961, 1962, and it was not until 1965 that it fell below the level of 1959. However, in the years that followed there was a near to precipitate decline in the number of persons living in poverty, while rates of exit reached 9 percent or better in 2 recent years.

Between 1964 and 1969, although the general population increased 25.3 million, the number of poor declined by 11.8 million persons, to a total of 24.3 million. Should that absolute level of decline persist, poverty will just about have been eliminated by the end of the present decade. This would mean an historic change in the economic position of black Americans. As late as 1962, 56 percent of blacks were living below the poverty level. By 1969 this proportion had dropped to 31 percent. This in itself is a change that might readily be recorded as a social transformation. During this period there has been a sharp increase in real family income for all recorded groups in the society. The overall ratio of Negro family income to that of white rose from 54 percent in 1965 to 61 percent in 1969, while for young married couples outside the South, parity, for the first time in history, was attained between black and white.

At the same time it would appear that profound changes took place during the 1960's—or first were recorded during that era—bearing on racial attitudes in the United States, and on the general role of the black citizen. After generations of massive disfranchisement in the South and a relative absence of significant political roles elsewhere in the Nation, the Negro electorate increased enormously in the aftermath of the Voting Rights Act of 1965, while Negro-elected officials became an increasingly familiar feature of urban government in all sections of the country. There were not less pronounced changes in racial attitudes, or at least attitudes that emerged from careful surveys were considerably different from those that had been assumed. Thus the study "Racial Attitudes in Fifteen American Cities" prepared for the National Advisory Commission on Civil Disorders presented a picture at once remarkably at odds with the view of the Commission's formal report, and with the general stereotype of rising racial hostility. American citizens, black and white alike, emerged as notably accepting of one another, and fundamentally persuaded that it is individual effort and capacity that count in life, as against caste or class consignment.

Similarly, while the issue of school integration remained troubled and in ways increasingly disputatious during the 15 years following the Supreme Court decision in *Brown* vs. *Bd. of Education,* and white attitudes were thought either to have remained frozen or to have actually deteriorated, in May 1970 the Gallup Poll reported just the opposite. In 1963 six in ten Southern white parents had said they would object to sending their children to schools where Negroes are enrolled. By 1970 this proportion had dropped to only about one parent in six. The Gallup Poll remarked, "This finding represents one of the most dramatic shifts in the history of public opinion polling."

Yet this particular reality is counterbalanced by another. The 1960's not only saw immense changes in the objective situation of the black and the poor in America, it saw also an even greater escalation of the rhetoric of denunciation of the society for the failings that are, in a sense, implied by the very existence of such categories. This is not an inexplicable phenomenon. For well over a century observers of American society have been turning out elaborations of de Tocqueville's original perception that as conditions for a group improve, the gap that remains grows steadily less tolerable, with the rough result that the better things are the worse they are said to be. More recently social scientists have formulated this in terms of "goal gradients," with the hope that the phenomenon cannot only be described, but can be measured. But it remains part of the reality; part of the price a society pays when it consciously seeks to change things for the better.

A not dissimilar experience probably awaits the Nation as it moves—assuming it does—toward the conscious adoption of a national growth policy, as proposed by the President in his 1970 state of the Union message. There seems to be general agreement that under any circumstances the United States population will continue to grow for the next 30 or so years, and that this growth will result in adding 60 to 100 million persons to the population by the year 2000. (A fifth or more of this increase will come from immigration.) The extraordinary quality of elemental social data such as this is that, once it is known, all knowers are implicated in the knowledge.

The American population has been growing for three centuries. Somehow, however, it is not until now that this knowledge has forced itself on the national consciousness in a form suggesting that preparations ought to be made to accommodate the change which, in a sense, has already occurred because it is known that it will occur. It is abundantly clear that it is no longer sufficient to equate satisfactory national growth with a 4.2-percent increase in the gross national product. It is not clear, however, that those who manage this not especially remarkable perception are capable at the same time of seeing that it is only because growth in the GNP has come to be so large and so regular, that it is now open to the Nation to discuss which sectors of the GNP are to be encouraged, which discouraged. Similarly, as the American population accumulates in complex urban conurbations largely located on the coastal periphery of the Nation (including the Great Lakes area), it becomes possible to grow increasingly critical of the course of urban development, without recognizing that it has been the wealth generated by this movement that makes possible the consideration of more elegant alternatives. Perhaps most significantly, as a growing proportion of the population becomes well educated and affluent, it becomes ever more likely that it will identify its own interests in redirected or even terminated national growth with that of the still much larger proportion of the population which still properly looks forward to a fairly straight-line increase in earnings and income. All in all, the decade of national growth policy is not likely to be an especially peaceable one.

More then will be the need for increasingly accurate and easy-to-follow social data that describes the past and present, and reasonably projects the future. A new role for social science emerges. If government is to be directed in terms of general policies, such as a national growth policy, it becomes increasingly important to be able to make some assessment in advance of the effects of particular interventions on the system as a whole. This is a form of evaluation that predicts results rather than simply measuring them. It is, in effect, evaluation in advance: a large, challenging, promising goal—a goal which if seriously and successfully pursued, holds

out the prospect of a system of self-government that grows increasingly meaningful as citizens are asked to make choices among options that are not partially, or even deceptively, but fully described by governments which thereafter can be held just as fully accountable.

Do Americans wish this to happen? No one is in a position to say. Yet there exists at this moment a fact of very considerable significance. The Eighteenth Decennial Census has just been taken. It was not only the most comprehensive, detailed, informative census ever attempted, it also produced (at least by all early indications) far the most willing and universal response ever from the people themselves. This was not a routine event. A considerable effort had been mounted to restrict the scope of the census, and to present it as in some way an intrusion into the personal life of the citizenry. The citizenry thought otherwise. It is a good sign that in the decade ahead we shall considerably enhance our abilities not only to collect such data, but to put it to the good purpose of democracy.

Report of the National Goals Research Staff

## INTRODUCTION

Making intelligent policy choices becomes increasingly complex as society itself becomes more complex, and as the consequences of various courses of action become more far reaching and more intricately intertwined.

It is no longer enough to content ourselves with choosing what *seems* right, on the basis of a cursory glance or a quick calculation of the immediate consequences. Increasingly, we have to concern ourselves with the second and third order consequences. Increasingly, we have to weigh immediate advantages in one area against long term disadvantages in other areas. These cannot be snap calculations. They require a penetrating understanding of the processes by which the consequences are brought about. They require sophisticated means of weighing the alternatives. They require new ways of measuring the competing values that have to be balanced. They require that we understand not only what the "trade-offs" are, but also what they mean.

But if the choices are more complex, our means of making those choices have also been greatly advanced.

The vast increase in scientific knowledge, in technological capability, in our understanding of the economic and social forces that shape our society, all greatly increase our capacity to make intelligent choices about our future—and thus they also increase our responsibility to approach the process of choice in a rational and deliberate way.

New tools and techniques have been developed that help make the complex comprehensible: for example, computerized information systems, "futures" research, computerized modeling of complex systems, and social indicators. As this report points out, such tools have had varying success—having generally been most successful in the planning and operation of physical systems, next best in handling economic problems, and least successful in dealing with complex social and political problems.

But we also have other resources to call on—not least, the rapidly accumulating lessons of experience.

Of all the advances in our understanding of the ways in which human institutions work, none is more significant than those we now are making in our understanding of the means by which results that we want can be achieved and those we do not want can be avoided.

This understanding is by no means perfect—far from it. Though there have been vast increases in what we do know, there still is a great deal we do not know. We still must expect many surprises, some of them unpleasant.

We could go seriously astray if we either overestimate or underestimate our capacity to achieve the results that we want. But we can achieve them more fully to the extent that we succeed in harnessing disciplined intelligence and closely reasoned analysis to the choices that confront us—and to the definition of those choices. How we define the choice is fully as important as how we make it. Unless we define it properly, we cannot make it wisely. Unless we trace through the probable consequences, we choose blindly. If we have the wisdom and the patience to follow these steps, however, then to an extraordinary and increasing extent the future is ours to shape by conscious choice.

## Other Reports

When President Nixon established the National Goals Research Staff, he said that one of its functions would be to make a public report on July 4th "setting forth some of the key choices open to us as a Nation and examining the consequences of those choices." He added:

"It is my hope that this report will then serve as a focus for the kind of lively widespread public discussion that deserves to go into decisions affecting our common future. The key point is this: it will make such discussion possible while there still is time to make the choices effective. Instead of lamenting too late what might have been, it will help give us, as a people, both the luxury and the responsibility of conscious and timely choice."

In the course of preparing this report, the National Goals Research Staff has encountered many differing expectations as to what it would or should include. Use of the word "goals" has quite naturally led a number of people to expect a specific set of targets—how many houses, schools, and so forth. It should be emphasized at the outset, therefore, that this is neither the purpose of the report nor the function of the National Goals Research Staff. The Staff did not have a goal-*setting* function; neither did it have a planning function. Rather, its purpose has been to pull together analyses into a comprehensive, long-range view of policy alternatives that can serve as an aid in the process of decision.

This report differs sharply in concept from two others issued within the last decade, also under Federal sponsorship: *Goals for Americans,* 1960, the report of President Eisenhower's Commission on National Goals; and *Toward a Social Report,* a study sponsored by the Department of Health, Education and Welfare in early 1969.

*Toward a Social Report* devoted itself to a kind of "report card" on the domestic society, using numerical measures called "social indicators." *Toward a Social Report* provides some social indicators that are designed to help Americans evaluate the performance of the society. The NGRS has been working with the Bureau of the Budget's Office of Statistical Policy to develop regularly published social statistics using available data, but the NGRS did not attempt in this report to duplicate the efforts in *Toward a Social Report*.

President Eisenhower's Commission on National Goals addressed a wider range of subjects than the NGRS report. The Commission report dealt at length with foreign policy issues, a topic which has been thoroughly treated in President Nixon's February 1970 report, "United States Foreign Policy for the 1970's: A Strategy for Peace." Finally, the Eisenhower Commission report is largely prescriptive and does not pose the issues for debate by the American people as does this report.

## The Theme of this Report

This report is designed not as a listing of specific goals to be sought, but as a springboard for discussion and an aid to decision. It does not presume to say *what* our choices should be. Rather, it defines the questions, analyzes the debates and examines the alternative sets of consequences.

For example: Confronted with the trend toward ever greater concentration of a growing population in already crowded metropolitan regions, should we accept the present trend? Or, if not, to what extent should the focus of public policy be on encouraging the spread of population into sparsely populated areas, fostering the growth of existing middle-sized cities and towns, or experimenting with the development of new cities outside of existing metropolitan areas? Given the present threat to our natural environment, how should we balance changes in patterns of production and consumption with new means of waste disposal or recycling—and how should we allocate the costs? Should they be borne by producers, by consumers, by the general public—or by what combination of these? How can consumer protection best be advanced without so interfering with the market mechanism as to leave the consumer worse off in the long run?

The purpose of this report is to alert us to emerging needs, to stimulate us to think more deeply, more cogently and more analytically about the questions we face, and to give us a better appreciation of the framework within which those questions must be dealt with.

For too long a time, we as a Nation have responded to problems in a reactive fashion, concentrating our time, money, and energy on treating them on an emergency basis, with consequences that could have been avoided if we had exercised more foresight. One of the central lessons

of our present difficulties is that we must learn to anticipate both problems and opportunities—in a sustained and systematic way—in advance of their occurrence. To do so is in no way to turn our back on present concerns. *We must simultaneously attend to what is urgent, and do our best to foresee and respond to what is imminent.*

## Balanced Growth

This report is concerned with the "emerging debates" in a number of related areas, all centered on the theme of balanced growth.

The report is not meant to be comprehensive, and neither does its selection of subject areas indicate any order of priorities. The specific questions it discusses have all been selected because they illustrate one or another aspect of the questions involved in achieving a pattern of balanced growth.

It touches only tangentially or in a limited way, for example, on such matters of intense and immediate concern as eliminating racial barriers, reforming programs for the poor, reducing crime and modernizing the structure of government. But it does deal with a framework within which approaches to many of these other problems can better be developed.

The processes of growth are ones in which momentum is strong and lead times are long. To a very great extent, they also determine what can be done about our more immediate problems, and how.

For example, the way our future population increase is distributed will have a major and in many ways decisive effect on long-term urban policies. How perceptively we manage technology assessment will have a great deal to do with the extent of our future environmental problems. The way we structure our educational system will determine the kind of preparation future generations receive, and also, to a substantial extent, will shape their attitudes toward the American system itself.

From the nation's founding, one of its most spectacular characteristics has been its growth. We grew geographically, as we stretched across a continent and tamed the West. We grew in population, as hope for a better life drew millions across the ocean. We grew in wealth, as our farms became more efficient, as our industry became more productive and as the special American genius for organization devised ever more effective means of producing and distributing an even wider array of increasingly sophisticated goods. We grew in strength as we responded to the call of our beleaguered allies in two world wars, and as we finally found ourselves, without having sought it, in a position of world leadership. We grew in understanding, as more of our people acquired the benefits of more education. We grew in our scientific and technological capabilities, in the reach and complexity of our social institutions, in our

level of social awareness and concern, in the excellence of our arts and culture and in our knowledge of the forces of nature.

But increasingly, we have become aware that growth is not enough. We have become alarmed at the threats to our environment posed by industrial and technological progress. We have developed a new and acute awareness that the quality of life cannot be measured in quantitative terms.

Concern has bred alarm, and some have urgently demanded that we call a halt to growth altogether. Yet our need is not to stop growth, but to redirect it. As the report points out, we need to refine and elaborate a concept of "balanced growth," and to develop the guidance mechanisms through which it can be achieved on a sustainable basis.

Many of the central debates of this coming decade will be, and should be, over how the various balances should be struck in a policy of balanced growth.

But first, we need a deeper and more widely held understanding of what balanced growth itself entails. In the present state of American technology it is quite clear that we *can* have quantity with quality. In fact, given our rising levels of expectation, we cannot have quality without quantity. But it is equally true that quantity without quality is no longer adequate either as a goal or as a standard of measurement.

In the President's State of the Union message last January, he put this question:

> In the next 10 years we shall increase our wealth by 50 percent. The profound question is—does this mean we will be 50 percent richer in a real sense, 50 percent better off, 50 percent happier?
>
> Or does it mean that in the year 1980 the President standing in this place will look back on a decade in which 70 percent of our people lived in metropolitan areas choked by traffic, suffocated by smog, poisoned by water, deafened by noise and terrorized by crime?

The same kind of question can be asked of all the areas dealt with in this report. And the answers depend on what we do to achieve a balanced growth: how we strike the balances, and how well we succeed in achieving the balances we choose.

### The Focus of this Report

The NGRS report is neither a list of social objectives and aspirations nor an effort at measuring the domestic social health of the Nation. Its aims are more modest; this report seeks to open issues to discussion within a particular theme—that of seeking means by which the country can find preferred ways of growth and development, with the hope that

America's talents and wealth can be used to provide a quality of life commensurate with its potential.

The first chapter sets the theme and attempts to put into perspective the debates occurring in our society. It outlines the specific areas in which some debates and discussions are occurring. It suggests the proposition that our citizens can mold the future of their Nation in the directions which they desire.

The next six chapters explore the areas of debate in more detail. The next to last chapter, "Economic Choice and Balanced Growth," describes some of the economic concerns involved in exercising options posed in the previous chapters on the management of the Nation's economy.

The final chapter highlights some of the lessons of the debates and their implications for developing a policy of balanced growth.

The purpose of the report is to describe issues, and the style, therefore, has been descriptive and verbal rather than quantitative. Examples of quantitative support for many of the trends described in the chapters will be found in Appendix A, "Selected Trends and Projections."

**Acknowledgments**

Any report of this nature depends on the thoughtful contributions and assistance of many people.

The NGRS has received invaluable assistance and cooperation from professionals, analysts, scholars, and many others—both within and outside the Government. The number has been so large and the nature of their contributions so diverse that any decision to extend special thanks would pose problems of equity. Appendix C lists those who have given so generously of their talents and time, and we wish to take this opportunity to extend to them our deep gratitude.

WASHINGTON, D.C., *July 4, 1970.*

## Chapter 1. EMERGING DEBATES

In his state of the Union message of January 1970, the President stressed that wealth is not synonymous with happiness, that economic growth is required not as a thing desirable in itself, but for the achievement of specific social goals, that our relationship to the environment must shift from an exploitative mode to one of living in harmony with the environment. He called for development of a growth policy. In making these statements, he reiterated an argument that has been expressed somewhat independently in a number of separate institutional areas; i.e., in order for continuing social transformation to be progressive, its growth processes must be purposeful.

Our country has never dedicated itself solely to conventional economic growth. Concern about what is now called the "quality of life" is not new in America's life, and rarely has anyone advocated national policies to promote growth only for its own sake.

However, ours is a society which, until recently, rarely questioned the virtue of continued economic growth per se. We were further proud of our ability to generate a flood of new technology and consumer products, and of our ability to expand our scientific knowledge and educational resources. But today there is an explicit challenge to the view that we can or should continue to encourage or permit the unfettered growth of our economy, population, technology, use of materials and energy, flow of new products, and even of our scientific knowledge. Some manifestations of this challenge are too sweeping to deserve policy consideration, but others are unquestionably reasonable, and the circumstances precipitating them sufficiently concrete and urgent as to warrant priority attention by public policymakers. Viewed in historical perspective, these challenges signify that a profound re-examination is taking place of man's view of his relationship to nature, to his institutions, and to his fellow man.

The growing challenge to established viewpoints by new concepts is the substance of certain emerging debates that come about not only because of some doubts about the effectiveness of our institutions and the anticipation of worsening future problems, but also because our wealth now provides the latitude and the ability to alter parts of the national life that are found wanting. For example, pollution has become a na-

tional problem not only because its symptoms are evident, but also because the promise exists that resources and programs to deal with it may become available; both a visible dissatisfaction *and* the ability to intervene in the causes of dissatisfaction encourage debate.

This call for a growth policy occurs in the midst of a period of rapid social change marked by problems that indicate that even more change is needed. A growth policy is only one element in the total process of social change. It is one set of principles that will influence that change.

The exclusion or inclusion of a topic in this report is not intended to reflect the degree of national priority attached to it. Viewed by the number of people directly affected and by the degree of intensity of the effect, the issues of poverty, minority group status, student unrest, and urban problems are more urgent than, for example, the consumerism movement or the plight of basic natural science—topics that are discussed here.

Important problems, such as equal opportunity and student discontent, are among the driving forces that stimulated the debate over growth policy. While some of these socially urgent issues receive explicit attention in this report, the topics selected for inclusion mainly represent those in which active ongoing debate relevant to a *growth* policy can be identified: population size and distribution, environment, education, basic natural science, technology assessment, and consumerism. These subjects are included because they can be instructive concerning the growth problems—other than that of managing the overall economy—with which we are actually grappling in an effort to reach a policy of balanced growth.

## The Debates

The specific issues involved in each of the areas can be outlined as follows:

*Population.* The traditional view of population growth as a source of national pride and strength is being re-examined. Some authorities argue for zero population growth on the grounds that population stability is imperative for survival, or will improve the quality of our society. (For example, it might enable us to avoid the issue of limitations on the use of energy and materials.)

The merits of sheer size now appear more debatable than heretofore, particularly in the case of large metropolitan areas. Large concentrations of population generate serious pollution problems, traffic congestion, and higher per capita public expenditures. And they are unduly vulnerable to power failures, riots, and other disruptive social action. Thus, major questions are asked: should we limit our population size, and if so, how? And should we redistribute our population, and if so, how?

*Environment.* Historically, our concern over resources focused on whether there would be enough food, energy, and materials to meet our needs. Today, in the United States, the concern is about the ability of land, air, and water to absorb all the wastes we generate. We already have violated the aesthetic limits of pollution and, from time to time and place to place, we have violated health and survival limits of pollution. Some argue that the long-run issue may well be our survival. Questions often asked are: What can be done to repair the damage already done? To what extent and by what means will future pollution be contained within tolerable limits? Are there fixed limits of environmental tolerance that might make it imperative to limit the size of our population or set per capita quotas on the amount of energy and material we may use?

*Education.* Throughout its history, America's educational system has had to meet a variety of needs for a growing Nation. Today this system, after a long stretch of phenomenal growth, finds itself the target of deepening dissatisfaction. The nature and degree of the dissatisfaction implies the existence of unmet educational needs in our society. As the education system met earlier needs, a reciprocal relation was formed between our society and the schools. When society needed more skilled citizens it turned to the schools; in turn, the schools raised the knowledge and skill level of society, nurturing additional development in a continuing spiral of mutually supported growth. The question raised in the chapter on education is: What relation might be established between the educational system and a rapidly changing, complex society to achieve balanced growth? A number of specific issues arise, such as whether or not our colleges and universities should assume service roles in society as opposed to the traditional role of discipline-oriented institutions searching for knowledge for its own sake. Also, there are questions relating to individual self-development, equality of opportunity, educational achievement standards, and the financial problems of the schools. And, should we develop a wider diversity of postsecondary opportunities?

*Basic Natural Science.* To the extent that it was discussed at all in the past, it was generally agreed that science should grow according to its own internal logic as dictated by the structure of evolving knowledge and the criteria and judgments of the scientific community. In America since World War II, basic science continued to develop in its traditional spontaneous fashion because the available funds were so large compared to the capacity of the scientific community that almost everything scientifically worthwhile was funded.

Today, the relationship of the scientific establishment to its funding is being reversed. In relation to the capacity of the research establishment to do research, funds are deficient. Furthermore, many persons, including members of the scientific community, are concerned over the possibility

that the knowledge they develop will be used for ends they do not approve. Thus, knowledge no longer is seen as necessarily good. Furthermore, scientists and others have become acutely aware of social and environmental problems for which systematic knowledge may offer solutions, and basic science is asked to address these problems. Thus, the traditional "guidance" mechanism of science is being challenged at a time when funds have declined in relation to the capacity of the scientific community.

Among the questions asked are: To what extent should basic natural science be permitted to develop in a free unguided manner? How much support should the Nation give to development of basic scientific knowledge? To what extent and by what mechanisms should basic science and scientists (whether or not in the capacity for which they were originally trained) be pressed to solve specific social problems?

*Technology Assessment.* The sophisticated products of our Nation's technologists have been a source of pride and, sometimes, wonder. Largely free of governmental constraint, technology has tended to develop according to the internal logic of its usual industrial, public, and business sponsors. What seemed feasible and profitable was tried. What proved possible and profitable tended to be used. Technology accounts, to a large extent, for the productivity of our economy, our standard of living, our ability to keep a high proportion of the potential work force in school, our achievements in space, and—granting the perils of a nuclear age—our military security. But we have become increasingly aware of technology's adverse effects. Some highly sophisticated drugs produce severe side effects. Airplanes and automobiles make intolerable noise and foul the air. Advanced technology of all sorts produces unexpected and often unwanted indirect consequences. A movement called "technology assessment" now advocates a more pervasive and systematic assessment of the social costs and benefits of both new and existing technology. The main issues are: To what extent should the use of new and old technology be restricted because of adverse side effects? What institutional mechanisms might assess and regulate technology? What effect would such a policy have on economic growth and on the size and nature of our technological and scientific establishments?

*Consumerism.* While technology is a source of strength in our economy, the abundant flow of new consumer goods has been viewed as a clear indication that the economy brings vast direct benefits to the American people. Yet, in the past decade, this virtue has been questioned. A movement labeled "consumerism" contends that the rapid introduction of new products produces confusion, that the technical complexity of new products makes it impossible to evaluate their benefits or dangers and makes them difficult to repair, and that pressure on business firms

to introduce new products and services breeds marketing practices of a dubious nature.

The traditional doctrine of "consumer sovereignty" holds that the consumer is capable of protecting his own interests. Today, the proponents of the consumer movement argue that the consumer does not have the information with which to make an informed choice. The internal guidance system of the marketplace is challenged. The issues include: To what extent and in what ways is the consumer actually the victim of these circumstances? How should he be protected? In the course of this, how can a healthy business environment be maintained?

These are the topics on which the National Goals Research Staff was able to identify an active challenge to traditional views. They are presented in the ensuing chapters in greater detail as problems to be worked on the formulation of a future growth policy, and as the sorts of issues with which we will have to operate in pursuing such a growth policy. The style of presentation is descriptive and analytical. That is to say, it will strive to outline what the issues and options are without presuming to prescribe solutions. These issues challenge many deep-seated values.

In each of the problem areas described here, our institutions have failed to correct fully problems of which we are now clearly aware, and have created many new problems. This report suggests that our concern is leading us to develop a national goal of being more systematic and rational in assessing priorities and solving our problems.

## Toward Anticipatory Decisionmaking

What clearly emerges from these debates which have been subsumed under the label of a search for balanced growth is a dissatisfaction with old ways of decisionmaking. The implication is that we wish to shift from a reactive mode of dealing with problems that have forced themselves on us to an anticipatory mode in which we either attempt to prevent their occurrence or are prepared to deal with them as they emerge. The latter mode is necessary and desirable in times of rapid change because of the inertia of large systems. As the President pointed out in announcing the formation of the National Goals Research Staff:

> We can no longer afford to approach the longer-range future haphazardly. As the pace of change accelerates, the process of change becomes more complex. Yet, at the same time an extraordinary array of tools and techniques has been developed by which it becomes increasingly possible to project future trends—and thus

to make the kind of informed choices which are necessary if we are to establish mastery over the process of change.

The art of anticipatory decisionmaking in government is one which we are yet far from mastering. Yet, its desirability is so obvious that any move in that direction should be encouraged.

One of the tools for making this shift is, as the President has said, the understanding of the projection of present trends. However, the mere projection of trends can lead to pessimism. They tell us what is most likely to happen if two circumstances prevail: we continue present policies, and events of the rest of the world over which we have no control continue as expected. Frequently the implications are bad.

But the objective of projecting present trends is not primarily to find out what will happen to us if we do nothing to change the trends. It is to give us some clue as to what to do so that our future might be brighter. For this purpose we must imagine which alternative futures are open for us to choose. We must invent feasible and desirable futures and devise policies which will get us there. This is the role of goal setting in national action. It is to enable us to decide where we want to be, and thereby to stimulate us to figure out how to get there.

The acceptance of this mode of national decisionmaking has certain corollaries. One of these, reflected in many arguments related in this study, is that we must evaluate the consequences of our actions on the basis of wider criteria than we have used in the past. For example, the popular phrase "quality versus quantity" has, in some contexts, been taken to imply a turning away from economic goals. This should not be so. There does seem to be, however, a disposition to evaluate our actions and policies in a framework broader than solely technical and immediate economic considerations. Per se, this cannot be said to be new to the American scene. But the emphasis and degree of commitment do seem to be new, and would be a vital ingredient to the adoption of an anticipatory mode of decisionmaking.

Another corollary that flows naturally from our experience and the development of an anticipatory approach to decisionmaking is the acceptance of the complexity of the systems in which we live and on which we act. To say that everything is related to everything else is a true, but sometimes thankless, statement. It is nevertheless true, and to the extent that we can make our decisions with consideration for the fullest feasible set of interactions that we can visualize, we will be less likely to defeat our own purposes.

The acceptance of the complexities involved in purposive social action will often lead us to the conclusion that the solutions to our problems are more difficult than they appeared to be at first glance. In this circumstance there is both a hope and a danger. The hope is that we will

undertake action realistically, and not do so under assumptions that will produce a violation of the public's hopes and expectations. Too often in the past we have attacked problems with the expectation that they could be solved in an unrealistically short time with an unrealistically low estimate of the resources required. The danger is that realism may discourage action. Yet experience shows that when advocates of action exaggerate the ease of success or alternatively overstate the risks of not acting, the consequences are likely to be either disappointment or loss of public support; these can be more discouraging to policy actions than an objective appraisal of the difficulties and the possibilities would warrant.

While we have come to appreciate the complexity of social and environmental processes, our present knowledge of those complex processes is extraordinarily incomplete. From this, it follows that for the long range we must vigorously pursue the extension of our knowledge of these processes. And, for the short range, since our ability to anticipate exactly what will happen is so limited, we must sharpen our ability to detect as rapidly as possible that which has already happened. This requires the development of new, improved methods for the measurement of social change.

Complicating the adoption of such a strategy are the changing roles of citizen and government. This is particularly pertinent since the hope for responding better to long-range matters rests in part on newly evolving techniques of forecasting and planning, the tools largely of specialists. Yet at the same time, citizens are demanding and getting a greater voice in their affairs, and the Federal Government is evolving a new role for itself more as a shaper of policies and less as a doer of things. There is a built-in tension in this situation which one must assume can be resolved with care, patience, and wisdom.

The concepts and tools for developing an anticipatory strategy are still being worked out by analysts and scholars. The methods are being tried with varying degrees of success in both the private and the public sector. The difficulties are enormous. The promise is great. The length of time and the efforts to arrive at such a strategy, and the degree of success we will attain are indeterminate. Yet, we seem to be committing ourselves to trying it.

## Premises of the Debates

Our society appears to be one at a point of significant transformation, sometimes described as that from an industrial society to a "post industrial society"—from a society in which production of goods was of primary concern to one dominated more by services and the generation and use of new knowledge. Further, we are in a period of marked social

change, one aspect of which is the search for a growth policy that will guide that change.

These developments form the background of the debate over whether growth—in our economy, population, material goods, and even knowledge—is to be valued for its own sake, or whether we should place increased emphasis on more carefully channeling our growing resources to improve the quality of our lives.

The major causes of the debate seem to be:

1. The changing values and a rising level of our expectations concerning the goals that we should set for ourselves in both resolving inequities and improving the quality of our lives.

2. A realization that our resources, although substantial and likely to grow in a generally predictable fashion, are limited, and, therefore, more consideration should be given to the setting of priorities for their use.

3. The development of a wide range of management and planning tools that offer some promise for more rational setting of priorities and for effective action.

Also, as part of the background for the debate, are two additional circumstances:

1. The notion that priority setting, planning, and decisionmaking can remain an isolated "staff" function is not tenable. Such crucial activities on the national level are an integral part of the political process, and probably can work only to the extent that the results are persuasive to citizens who are demanding a more direct representation in decisions affecting their lives.

2. Our model for managing change in complex systems, whether social or environmental, has come to reflect the caution that is appropriate to such complexity. And our society has, in fact, become increasingly complex and interrelated.

These two circumstances, while complicating the task, inject appropriate realism into the process, assuring more acceptability of proposed programs, while reducing the probability of unexpected, unwanted consequences. It must be admitted, however, that it is not yet known how to involve the public most effectively in national decisions. However, in our democracy, decisions in which the public does not concur will be changed emphatically in the privacy of the polling booth.

Constructive public discussion of alternative goals, priorities, and policies, with all groups of people participating, must be initiated. The fruits of this public discussion should be incorporated into policies aimed at alleviating the problems or enhancing the opportunities.

This report is one attempt to contribute to such discussion. The critics seem to be saying that many of our institutions aim at growth for its own

sake, but growth now should be directed toward achieving the higher social goal of improving the quality of human life.

## Summary

America appears to be at a point of profound change, frequently characterized as that from an industrial society to a "post industrial society"—from a society in which production of goods was of primary concern to one dominated more by services and the generation and use of new knowledge. Consequently, we are in a period of marked social change, one aspect of which is the search for a growth policy to guide that change. This report examines several areas in which the choice of a future growth policy is explicitly or implicitly being debated. Its intent is to use these case examples as a part of a learning experience, as one discrete step in the evolution of a policy of balanced growth, as called for by the President. The approach is analytical and not prescriptive. The purpose is to aid the American people and their representatives in what is assumed to be a long process for evolving a growth policy.

The key substantive areas in which the problem of growth is being debated are: population growth and distribution, environment, education, basic natural science, technology assessment, and consumerism. In general, these topical areas do not correspond to the major social problems with which we are presently concerned, including those of our cities, campus unrest, the Vietnam War, and race relations. These represent dissatisfactions over our performance according to our established priorities.

Probably the major message that comes from the existing debates over a growth policy is not that our institutions have proven incapable of doing their job. Rather, many of our institutions have performed very well the tasks which we set for them a few decades ago. However, in so doing, they have created unanticipated problems with which we must now deal, and they must be reoriented toward the tasks that are appropriate in a society capable of a new level of performance. The range of criteria whereby we will judge institutional performance will be broader in scope and longer in time perspective. An essential part of this period of transition is the attempt to shift from a reactive form of public decisionmaking, in which we respond to problems when they are forced upon us, to an anticipatory form in which we try either to avoid them or be prepared to deal with them as they emerge.

It is the hallmark of our country that Americans have adjusted to change while preserving the basic qualities of their institutions. This has happened a considerable number of times in our history. In the course of this history, a predominant theme has been one of economic

growth, and an accommodation to a larger population. At no time was economic growth considered so dominant a goal that it obscured all other concerns, but neither was the growth per se viewed as other than a good thing.

Today, for the first time, we find the virtues of economic growth questioned, and this issue is put in popular terminology as one of "quantity versus quality." This is, in the view of this report, a false phrasing of the issue, since the new qualitative goals being proposed and the old goals yet unmet can be achieved only if we have continued economic growth. The issue is better put as one of how we can ensure continued economic growth while directing our resources more deliberately to filling our new values.

A large portion of the explanation for this seems to lie in our demonstrated ability to achieve economic stability and growth in the period following the passage of the Employment Act of 1946. Even though our economy is at the moment in a period of transition, the pervading public and official view is that we are a Nation of growing, unprecedented economic resources.

At the same time that we have become a Nation that can afford to care we have also become a Nation that cannot afford not to care. The past decade has been marked by an emerging sense of conscience for the plight of the underprivileged, an awareness of social and economic problems that are the unanticipated consequence of our past actions, a resolution that we can guide our affairs more rationally, and, simultaneously, a broad popular demand for citizen participation in the management of their own fate. While this was happening, we also developed new techniques of decisionmaking whose promise spurred the resolution to run things more rationally, but whose full potential is incompletely understood or tested.

While this resolution to run our affairs both more rationally and more effectively was emerging, two complicating circumstances arose. The Vietnam War placed a strain on our admittedly large resources and belatedly forced us to recognize the necessity of considering priorities more seriously. And, a more complex model of how to go about purposive action evolved in part from the ecologists' experience with the environment, and in part from our increasing knowledge of social science and our mixed experience in attempting social and political reform.

We thus find ourselves at a point at which the following things are true: We have rising expectations and changing values concerning the goals we should set for ourselves both in resolving existing inequities and in improving the quality of our lives. However, while our resources are large and growing, they are finite and we must set priorities

more deliberately. In compensation for this complication we have the promise of more rational methods of public decisionmaking as a way of selecting and implementing our priority goals. But, this must be brought about in a context in which there is greater public participation, and greater recognition of the complexities of the world—both social and environmental—in which we live.

# Chapter 2. POPULATION GROWTH AND DISTRIBUTION

The first chapter discussed some of the ways that we have come to review and assess our present patterns of growth and change. One of the most important elements in national development is the size and the physical location of our population. This chapter deals with the issues of population size and distribution, the goals that have been suggested, and programs that have been offered as "population policy" for America.

The size, growth, and distribution of the United States population, subjects that in the past tended to be the reserve of the scholarly profession of demography, have in recent years become increasingly debated issues of public policy. Not only is there a general awareness of the calamitous consequences of rapid population growth in less developed areas of the world, but there is also a widespread concern that our own population has been growing, and will probably continue to grow, at a rate that threatens to produce acute social, educational, economic, and environmental problems.

## The Issues

Is population growth a problem for the United States? In the debate that has developed on the question of growth of the U.S. population, there has been wide disagreement over the interpretation of "facts." The area of disagreement among the experts in this debate begins with the question of whether there is or will soon be a population problem; and even where there is agreement that a population problem exists, there is much disagreement over the definition of the problem and little agreement on proposals for its solution.

On the one side of the debate, we find many who view population growth as a problem second only to war in its dangers. A number of population experts have handed mankind a stark choice—population control or race to oblivion. They depict overpopulation as the dominant problem in all our personal, national, and international planning. They publish advertisements that speak of the horrors of the "population bomb" and the "population explosion." Scientist Julian Huxley warns that overpopulation is the "most serious threat to the whole future of our species." A poet sees, as a result of "reckless breeding," millions crowding in among our "already crowded billions" until the needs of all these

multitudes "drive nations into madness." Even the National Academy of Sciences has warned that "in the very long run, continued growth of the United States population would first become intolerable and then physically impossible." [1]

On the other side of the debate, there are experts who contend that the country is *not* in the midst of a population crisis and is *not* facing an impending crisis in the sense of having more people than the Nation can sustain at a high level of economic and cultural well-being. Thus, Prof. Ansley Coale, in his presidential address to the Population Association of America in 1968, said:

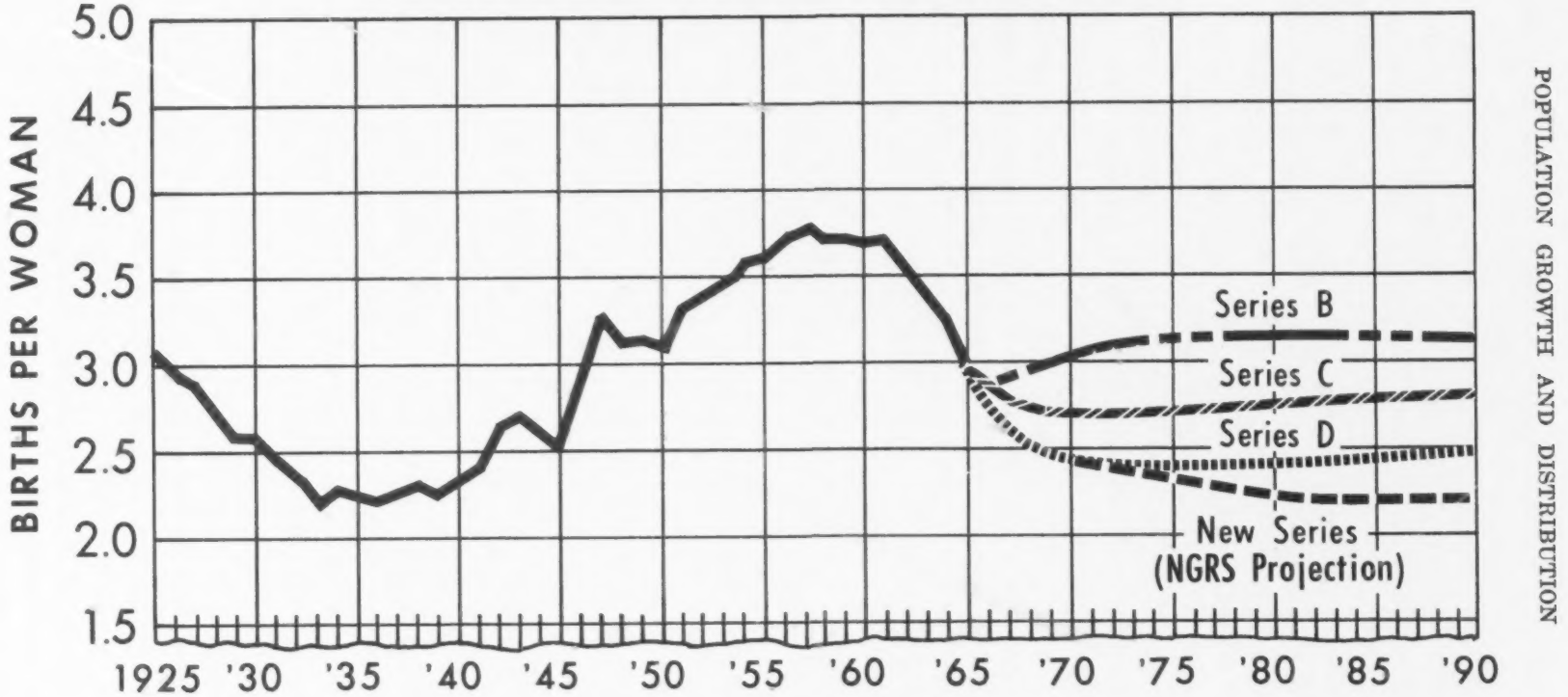
> Even if our population should rise to a billion, its average density would not be very high by European standards. It seems to me that we must attack the problems of pollution, urban deterioration, juvenile delinquency and the like directly, and if sensible programs are evolved, continued population growth on the order of one per cent annually would not make the programs tangibly less effective.[2]

This school of thought points out that the historical trend with respect to the annual growth rate has been downward since the pre-Civil War period, when it was 3 percent. Our population is now growing at the rate of a little more than 1 percent per year, and it has been growing at that rate for nearly a decade. Furthermore, while this rate may rise during the 1970's, as the proportion of women of childbearing age increases, it should then recede to its present level or perhaps even go below it.

This point of view finds support in a recent decision of the U.S. Census Bureau to lower its estimate of the range of probable growth of the U.S. population by the year 2000. Last year, the Census Bureau projections ranged from 80 to 160 million additional people by the year 2000, with a median projection around 100 million—or a 50-percent increase in our population during the next three decades. Now it is thought to be just as possible that fertility might drop to a level that would stabilize the population in a decade or so (assuming measures were also taken to reduce immigration, if necessary). (See figure 2–1. The new lowest series is hypothetical and does not represent an official Bureau of the Census position.) This possibility plainly is incompatible with the idea of a current or impending U.S. population "explosion."

In the midst of this argumentation a central question goes unanswered: *What is the ideal size of America's population?* Any claim that a country's population is too large or too small implies an ideal or optimum size, and some standard by which to measure deviation from it. To date, no population analyst or policymaker has developed any objective criteria for arriving at an "optimum population" for a given area at a given time.

## TOTAL FERTILITY RATES FOR THE TOTAL POPULATION, BY CALENDAR YEARS, 1925 TO 1990




Notes: Total fertility rates represent sums of age-specific birth rates for a given calendar year.

**Figure 2—1**

Any search for an optimum population size is complicated by social, technological, and cultural change. Thus, at the time of Columbus, what is now the United States supported hardly more than a million people and, because of the harsh conditions of life in many areas, may have seemed to some tribes to be overpopulated even then. Yet, 4½ centuries later, under remarkably different cultural and technological conditions, the same land supports 200 times as many—and at a material level of living incomparably higher than that of its original inhabitants.

Furthermore, whatever might be said of the present or impending population problem in the United States, it cannot be said that it is Malthusian in nature: Our population is not pressing upon the domestic food supply. We are not threatened with the "positive checks" of famine or pestilence, and the third so-called positive check—war—is, for the United States, entirely independent of internal population pressures. In the current debate, the question of whether this country has a population problem turns on a very different set of factors than those envisioned by Thomas Malthus. Instead, it is related to the quality and safety of our physical and social surroundings.

In the nonindustrialized countries, population increase can deny the fulfillment of basic human needs—the need for enough to eat, for a place to live, for a job. In highly industrialized countries, the increase threatens to deprive us of the personal freedoms, pleasures, and quality of environment that become possible once basic human needs are met. The criteria for judging the population problem in the United States then is in terms of its effect on the quality of life—the kind of life one can lead in terms of health, education, housing, work, play, and personal freedom—on one hand and resource utilization on the other.

Nowhere among the affluent countries, it is argued by some, is the threat of population growth to the quality of life so real as it is in the United States. The very fact that we have the world's highest material level of living obscures the dangers inherent in rapid growth, and, at the same time, exacerbates many of the difficulties such growth entails.

At a more personal level in the debate is the concern that continuing population growth threatens to erode individual freedom. Rufus E. Miles, Jr. wrote in the *Population Bulletin* (vol. XVI, No. 1, February 1970), that—

> Population and freedom are inextricably intertwined. The larger, the more complex and the more crowded a society is—and the more its resource base is subjected to intensely competing demands—the more numerous and restrictive are the laws and regulations required for its governance. The more laws and regulations, the less freedom. The less freedom, the more tension. That popula-

tion growth significantly contributes to this loss of freedom and to increased tension seems self-evident.

In seeking a population policy, the American people must ask, then, whether individual freedoms and physical surroundings are significantly threatened by the continuing growth in the number of persons inhabiting the country. Answering this question is extremely difficult for a number of reasons. First, the experts themselves cannot agree on the most fundamental issues, as indicated in the above discussion. Second, it is not easy to separate the factor of population growth from per capita growth in the consumption of resources and the poorly regulated disposal of waste products—both of which contribute to the deterioration of our living space. Third, no scientific means is at hand for determining the extent to which population increase may heighten the discords in our social environment that are caused by ethnic and racial prejudice, poverty, drug addiction, and crime.

Another question: *Is the distribution of our population a problem?* Though there is no certainty that we face an imminent problem with the size of the population, there may be serious problems of over-population and under-population in various areas of the United States. Many experts believe that population shifts of the last two decades have had very detrimental effects on many rural areas, while simultaneously greatly aggravating urban problems.

The President cogently described the problem in his first message on the state of the Union: "Vast areas of rural America have been emptied of people and promise, while our central cities have become the most conspicuous area of failure in American life." On this point, there is no argument. Too many Americans have seen the sorrowful face of the deteriorating central city, the awesome pattern of suburban sprawl, and the sullen stagnation of the small town. The urban problem today can be described not only as the big-city slum, and as the white suburban noose around the inner city's blacks and poor, but also as all the problems of growth and population shifts and sprawls and public expenses connected with them.

The tide of migration from the rural South into the big cities lies at the heart of many of our urban problems today: much of urban poverty is rural poverty, recently transplanted. The great migration of the middle class and of jobs from the central city to the suburbs during the last decade has further exacerbated the problems of the city, of the poor, and of the blacks—since more than half of the Nation's black citizens now reside in central cities.

In recent years practically all the growth in the metropolitan areas occurred in the suburban rings. Since 1960, the central cities as a whole grew only about 1 percent; the suburban rings by 28 percent. In 1960,

the suburban areas had slightly fewer people than the central cities. Since then, the balance has shifted and today more than half the people in our metropolitan areas live outside the central cities. There is every indication that this fraction is likely to grow.

At the same time, rural America—our small cities, towns, and farms—has not only exported many of its poor to the central cities, but has also lost many of its young and able-bodied. While this migration is understandable, those left on the farm and in the small city often face a grim future—stagnation and a lack of economic opportunity. Rural America now holds only about a third of the total population, but contains about half of the Nation's poor. Also, owing to the prolonged and heavy outmigration of young adults, it is estimated that more than 500 counties are now experiencing a natural decrease in population—that is, more deaths than births are occurring. Most of these counties are in the center of the country—in Missouri, Kansas, Nebraska, Texas, and Illinois. Over the past 10 years, the total populations of three States—North Dakota, South Dakota, and Wyoming—have actually declined, according to first reports from the 1970 census.

Plainly, the country faces a problem in the distribution of its population regardless of policies to control its overall size. This becomes all the more serious to contemplate as demographic projections point to the likely continuation of such trends (assuming no change in public policies influencing them) which threatens further deterioration of both urban and rural areas.

Assuming that the trends continue unabated, most of the U.S. population growth over the next few decades will be concentrated in the 12 largest urban regions. These 12 metropolitan areas occupying one-tenth of the land area will contain over 70 percent of the population. Moreover, at least 50 percent of the total population will be found in three great metropolitan belts: Boston-Washington, Chicago-Pittsburgh, San Francisco-San Diego. These three centers will include an overwhelming proportion of the most technologically advanced and the most prosperous and creative elements of the society. (See fig. 2–2.)

At the same time, towns under 10,000 population, rural villages, and farms are expected to have the lowest growth rate. And the continued mechanization of farms will lead to a further decline in the use of agricultural labor, hence some further migration from farms to cities is expected. On this basis, the current farm population of 10 million (about 5 percent of the total population) may drop to 6 million, or only 2 percent of the total, by the year 2000.

These trends have led to a prevalent sense of gloom for the future of both urban and rural America. This outlook was summarized by the

## 12 MAJOR URBAN REGIONS PROJECTED BY YEAR 2000

HIGHLIGHTED AREAS REPRESENT:
218 Million People
71% of Mainland U.S. Population

Figure 2—2

Advisory Commission on Intergovernmental Relations (ACIR) in their 1968 study, "Urban and Rural America: Policies for Future Growth." According to that report:

> The Nation's smaller communities outside of metropolitan areas will be increasingly bypassed by the economic mainstream and will also find it difficult to offer enough jobs for all their residents and those of surrounding rural areas. Many rural areas will suffer from a further siphoning off of the young and able work force with a resultant greater concentration of older and unskilled among those remaining, and a continuing decline in the capacity of rural communities to support basic public services.

In regard to the cities, the ACIR was equally pessimistic in their report. The continuation of current trends, they concluded, would bring about such consequences as the following:

> While the evidence is not conclusive, it may well be that increased size and congestion will also take a net social and psychological toll in urban living conditions.
>
> The advantages of suburban areas in attracting new industry will continue to widen the gap between the economies of central cities and their surrounding neighbors, deepening the problems of many central cities. A most serious aspect of these problems will be the growing inability of the central cities to provide jobs for their residents. Continued migration of the Negro population to central cities will add fuel to already incendiary conditions in central city ghettos.
>
> Continued concentration of urban growth in suburban and outlying areas foreshadows a prolongation of development practices creating "urban sprawl"—the disorderly and wasteful use of land at the growing edge of urban areas.

This vision of the future has become widely accepted among experts studying the problem. Many believe that these developments are probably inevitable; that they are the consequences of the industrial revolution or of natural social evolutionary forces, as well as the collective manifestations of individual preferences. The fact is, however, that, if these developments materialize, it will be largely because of policy decisions.

Why is this so? Many of our large national enterprises, public and private, base their planning for investment and developmental decisions on their perceptions of demographic trends. Since each organization realizes that it alone cannot determine the trends, it seeks to shape its investment strategies to fit what it believes to be the most "objective" and hence the most probable future development patterns. As these policies are executed, the projections are powerfully reinforced so as to become self-fulfilling. Thus, in this sense, and without any intention to be so,

official demographic projections become an implicit form of national policy guidance.

This being the case, one can imagine a positive national development strategy that could operate in essentially the same manner, but result in a major redirection or reversal of current trends.

Research based on recent demographic data and analysis of past public and private policies affecting migration suggests that the trends toward megalopolis in some areas and under-population in others are reversible. It also suggests there is an opportunity for a different and more rewarding future for the Nation as a whole, than the discouraging vision of gargantuan megalopolis and rural desolation. But realization of a better future will probably require a coordinated national strategy for balanced population distribution. The Federal Government can provide leadership in developing any such strategy, but public and private institutions across the country will need to participate in both planning and implementation.

Significantly, there is agreement among the mayors and Governors with the view that policies are needed to deal with our population distribution patterns. Last year, the National Governors' Conference resolved to—

> petition the Congress to adopt a national policy of "enhancement and distribution of opportunity" in order to provide an incentive for a more even distribution of population residence in our states, and thereby, recognize the desirability of establishing such a goal to provide a sense of direction in Federal planning and in Federal programs which would seek to alleviate the growing national frustration that is occurring in overpopulated areas and in areas which are now losing population.

Similarly, the National League of Cities, at the December 1969 Congress of Cities in San Diego, called for—

> a specific policy for the settlement of people throughout the nation to balance the concentration of population among and within metropolitan and non-metropolitan areas while providing social and economic opportunity for all persons.

In short, the decisions Americans make today about population growth and distribution will greatly determine the kind of society we live in tomorrow. The size, distribution, and character of our population, and its rate of growth or decline all act as forces to change and shape social conditions affecting virtually every aspect of our lives.

## Population Policies in Historical Perspective

*Early Encouragement of Growth.* Consciously, or not, the United States has had a population policy from a relatively early date. From colonial times, most communities have wanted more people, at first to

increase the safety of life and later to enhance the value of their land and property, and to stimulate economic activity.

Settlement in the early days of the Nation was encouraged in a variety of ways. The land policy provided free or cheap land in farm units to foreigners as well as to natives if they would settle and work it. Immigration policies permitted easy entry, offered political asylum, and for a time, allowed the importation of slaves. Political leaders spread the idea that here the common man had opportunities never before open to him. As immigrants poured in, the surplus population in the East moved westward. By about 1890, the actual settlement of the land was almost completed; but since the industrial development of the country was also well underway by that time, there was still need for immigrants. Steamship companies and other groups profiting from immigration saw to it that the advantages of coming to the United States were well advertised. The policy of the "open door" was a huge success in populating the land.

*Gradual Restriction of Immigration.* Although public encouragement was generally accepted, there were those who felt that the "new" immigrants were inferior and that something should be done to preserve the economic advantages of the country for the descendants of earlier arrivals. In 1882, partly as a consequence of racial troubles in the West, the Chinese Exclusion Act was passed. In 1885, under pressure of organized labor, the Alien Contract Labor Law, which forbade entrance of foreigners under contract to individuals or firms, was passed. It was intended to prevent employers from breaking strikes and undercutting wages by using cheap labor recruited by agents in foreign countries.

Step by step, Federal policy shifted from stimulating immigration to discouraging it. The exhaustion of desirable free land put an end to the public encouragement of agriculture immigrants. The various quota laws in effect from 1921 not only limited numbers, but also were originally intended to influence the makeup of the population; these quotas were to preserve the composition attained before the arrival of the millions of eastern and southwestern Europeans who came during the present century. The open-door policy of the past was abandoned; not only were numbers restricted, but also there was definite selection of immigrants.

With the abolition of the national origins quota system in 1965, however, the number of immigrants entering the country annually increased sharply. For example, in 1968, net immigration was on the order of 454,000 contributing almost 25 percent of the growth in our population. Last year, net immigration was much lower but still amounted to almost 20 percent of total population growth. Moreover, it is estimated that by 1975, more than 70 percent of the net inflow of migrants into metropolitan areas will be foreign immigrants.[3] Thus, immigration policy must be a key component of any population policy.

*Evolution of Public Policy Regarding Birth Control.* The same attitudes which viewed unrestricted immigration as beneficial also encouraged the raising of large families. Large families were of direct advantage to much of the population. Farmers with several sons were assured of a steady labor supply with little or no wage payment. Nonfarm family incomes could be augmented if several minor children were at work. Having numerous children also provided the best way of insuring old age security in a pioneering community.

It is no wonder, then, that opposition to population control has deep roots. Here are some significant milestones:

In 1832, Charles Knowlton wrote a pamphlet (published in New York City) entitled *Fruits of Philosophy or the Private Companion of Young Married People* in which he advocated contraception and described some of the methods by which it might be accomplished. His book was considered an offense against public morality, and Knowlton was fined and imprisoned.

In 1873, Congress passed the so-called Comstock laws "for the suppression of trade in, and circulation of, obscene literature and articles of immoral use." These laws had the effect of outlawing information about birth control. The passage of these laws suggests, however, that birth control was becoming sufficiently common to attract the attention of those who were opposed to it.

In 1916, Margaret Sanger attempted to open the first birth-control clinic. Her efforts ignited considerable legal battles between those who believed that a man has the right to control by means of artificial contraception the number of children he has and those who believed that such control is harmful.

During the past 50 years, and especially during the past 20, private individuals and groups advocating the right of everyone to plan the size of his family have had a growing impact on public attitudes and public policy. This right, while subject to different interpretations and continued controversies, is now firmly entrenched in public policy.

The change in official attitudes is nowhere more clearly reflected than in statements and actions by Presidents Eisenhower, Kennedy, Johnson, and Nixon concerning birth control and population.

In 1959, President Eisenhower said:

> I cannot imagine anything more emphatically a subject that is not a proper political or governmental activity . . . . This Goverment will not . . . as long as I am here, have a positive political doctrine in its program that has to do with the problem of birth control. That's not our business.

This remained the policy of the Federal Government until 1961, when President Kennedy, in a special message on foreign aid, said:

> The magnitude of the problem is staggering. In Latin America, for example, population growth is already threatening to outpace economic growth. And in some parts of the continent living standards are actually declining . . . and the problems are no less serious or demanding in other developing parts of the world.

This concern with population growth in the foreign affairs context was soon reflected in Federal programs. In January 1963, the Department of Health, Education, and Welfare released the Public Health Service's *Survey of Research on Reproduction Related to Birth and Population Control.* The report listed 758 projects costing $8.2 million a year, of which $4.0 million came from Federal research funds. The report did not define a Federal policy, but made clear that Federal funds were being used to support research on human reproduction and fertility control.

President Johnson also indicated his concern with population problems in various speeches. It was in his administration that government-sponsored birth-control programs were developed and funded, eventually assisting more than 400,000 disadvantaged women.

President Nixon, on June 18, 1969, delivered the first Presidential message on population to the Congress, raising other fundamental questions about our population and the future. He asked: Where will the next hundred million Americans live? How will we house them? What of our natural resources and the quality of our environment? How can we better assist American families so that they will have no more children than they wish to have? To begin to deal with such questions, the President proposed the creation of a Commission on Population Growth and the American Future. This Commission was established by Congress in March 1970.

*Migration Policies.* Population distribution as a matter of conscious national policy also is not new to our country. In the first hundred years of the Nation, the Government deliberately sought to disperse population westward. Spurred by a desire to confirm its title to the empty continent, the Government subsidized turnpikes, railroads, and river navigation; moved Indians onto reservations; and opened public lands to settlement.

Once the continent was spanned, Government programs continued to encourage regional economic development. This was accomplished by reclamation, navigation, and electric-power projects, rural development programs, and more recently by the more sophisticated and broader efforts contained in the Appalachian Regional Development Act and the "depressed areas" legislation of the 1960's.

But even more important than the explicit population policies are the numerous implicit policies that have influenced economic development and population settlement. The fact is that while the Federal Government has no cohesive population policy, it is continually developing policies that have secondary consequences for the migration and distribution of our population:

—FHA and VA mortgage insurance, the interstate highway system, Federal and State tax policies, State and local land use programs, all contributed to the massive suburbanization of the last 25 years.

—Defense contract awards have accelerated the population booms in southern California and along the gulf coast.

—Agricultural research and support programs have accelerated depletion of the rural population.

These policies make individually positive contributions to society, but their collective impact may not be desirable from the standpoint of distribution of population and economic opportunity.

**The Choices for Public Policy Regarding Growth**

Let us now consider two fundamental population issues before the Nation and some alternative policies that might be developed to deal with them over the longer term. These are the questions of population growth and its distribution. Other aspects of the population question, such as problems of education, consumption, and dumping of waste, will be dealt with in other chapters of this report.

One of the essential choices with respect to the future growth of our population is whether the Government should intervene and exercise leadership in slowing the growth of the U.S. population.

Not to intervene implies continuation of the current national policy of "freedom of choice" in regard to birth control. This policy says that families should have no unwanted births, but it does not encourage lower birth rates as a goal. In essence, it is a policy that advocates only assistance for family planning, not limitation on family size.

The "freedom of choice" doctrine may be found in the 1966 United Nations Declaration of Population: "The opportunity to decide the number and spacing of children is a basic human right." This doctrine was also set forth by President Johnson in his 1966 Health Message to the Congress:

> We have a growing concern to foster the integrity of the family and the opportunity for each child. It is essential that all families have access to information and services that will allow freedom to choose the number and spacing of their children within the dictates of individual conscience.

The "freedom of choice" policy was restated by President Nixon in the first "Presidential Message to Congress on Population" on July 18, 1969:

> . . . How can we better assist American families so that they will have no more children than they wish to have? . . . One of the ways in which we can promote that goal is to provide assistance for more parents in effectively planning their families. We know that involuntary childbearing often results in poor physical and emotional health for all members of the family. It is one of the factors which contribute to our distressingly high infant mortality rate, the unacceptable level of malnutrition, and the disappointing performance of some children in our schools. Unwanted or untimely childbearing is one of several factors which are driving many families into poverty or keeping them in that condition. Its threat helps to produce the dangerous incidence of illegal abortion. And finally, of course, it needlessly adds to the burdens placed on all our resources by increasing population.

The emphasis of this speech and of Federal programs to date, significantly, has been on family planning to reduce the impact of poverty and deprivation and to improve health. Federal policy has sought to reduce "unwanted" births—not "wanted" births. A study conducted by the U.S. Department of Health, Education, and Welfare several years ago indicated that—

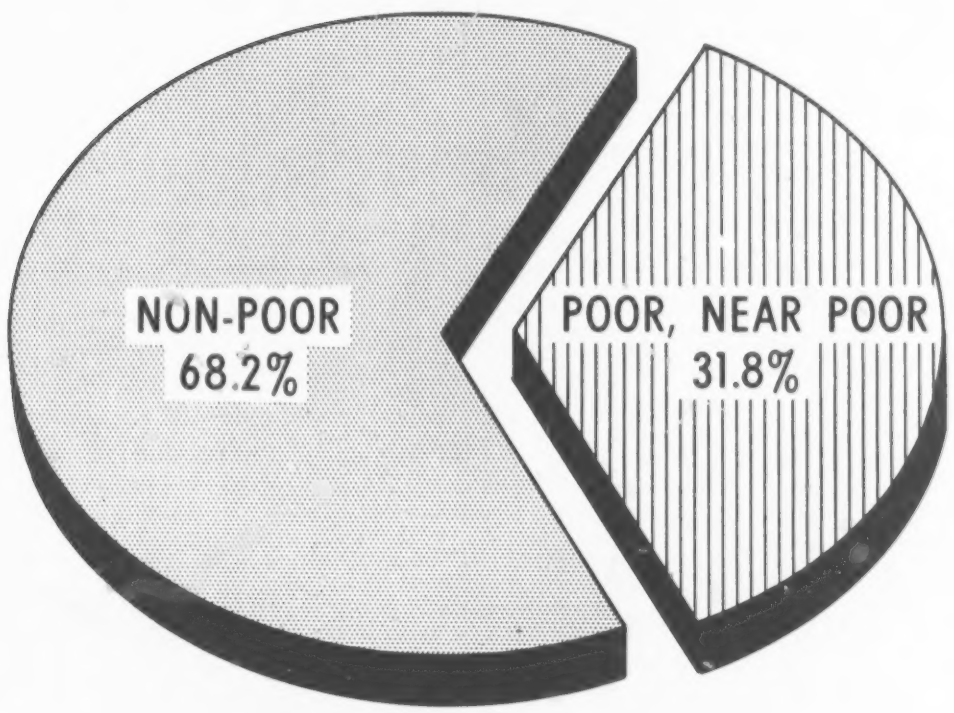
—in one year there were 450,000 births of what might be called unwanted children among low income women;

—probably 4 to 5 million disadvantaged women would use family planning services if they were available without charge or at costs they could afford, but fewer than two million were provided such services;

—about 450,000 families with four or more children living in poverty would not be poor if they had only three children to support.

This is not to imply, however, that the continued growth of the U.S. population is caused by poor people who have large families, so that if only they would have smaller families the growth problem would be solved. Much more than half the population increase in this country is contributed by families that are not poor and who regularly practice contraception. Although "unwanted" births pose a significant problem, middle-class families desire more children per family than the average 2.2 needed for replacement. Thus, the "wanted" child is seen as a major problem as well as the "unwanted" child. (See fig. 2–3.) For this reason, some of those concerned with population growth trends believe that Federal policy does not go far enough.

## PERCENTAGE SHARE OF ANNUAL U.S. BIRTHS, 1960-1965 AVERAGE




Source: Campbell, Arthur. "The Role of Family Planning in the Reduction of Poverty." Journal of Marriage and the Family, Vol. XXX, No. 2, 1968. Derived from special tabulations by the Bureau of the Census from the Current Population Survey, March 1966.

**Figure 2—3**

As for the consequences of continuation of the present Government policy, it is very difficult to predict population growth; forecasts in the past have tended to be wide of the mark. Only last year, we had come to expect another 100 million Americans by the year 2000. We are now advised that the figure may be considerably less. Indeed, there

is the possibility that the population might not grow at all after awhile. In light of such considerations, which tend to preclude a present or impending crisis in the growth of the population, it would appear that continuing along the present course would not run very high risks. If the trend were to change in an undesirable direction, public policy could be changed accordingly.

On the other hand, many have advocated that the country should strive to achieve a stationary population (zero rate of growth) in the near future.

A considerable number of population experts strongly endorse the goal of a zero rate of increase—that is, a stationary population—as soon as we can achieve it. This means that in the interest of society, all American families should have an average of two children. Even many of those who do not see the problem as pressing see this as a desirable goal.

This choice implies a significant change in public policy. It calls for a deliberate government effort to promote the reduction in the growth rate until population stability is achieved. It also implies that we must not leave the possibility of population stability to chance. It means we may have to do more than rely upon liberalized abortion laws in the States, and upon the distribution of free contraceptives to the poor, who are the focus of most U.S. family-planning programs. We may also have to devise ways of changing individual and social attitudes, governmental policies and incentives, and through these, the motivation of young people and adults in all socioeconomic groups.[4]

Even if the country elects the goal of arresting the growth of U.S. population by the end of the century, it is not at all clear whether or not the Government can bring about a societal consensus voluntarily to control the growth of the U.S. population within a generation. More active public policies might be required than "moral encouragement." Changes in tax laws and health insurance programs might help. An extreme form of an active public policy would be to regulate family size by fiat. Some persons have even gone so far as to suggest enforced sterilization when each family reaches its maximum allowance. Less drastic forms of coercion could be devised. But whatever the form, coercion in the regulation of family size is likely to be unacceptable to the American people.

The case for "mutual coercion, mutually agreed upon," has been made, for example, by biologist Garrett Hardin.[5] He has questioned whether the bearing of children can any longer be regarded as an "inalienable human right." He maintains that in attempting to control environmental degradation caused by population growth, it is unreasonable and against the public interest in the long run to depend on

people's consciences to limit the size of their families. The people with the strongest conscience, he says, will produce the fewest children, and those with the least conscience will have the most children. The only intelligent alternative, Hardin believes, is mutual coercion, mutually agreed upon.

In the meantime people are beginning to mobilize for action around the arguments. Private organizations dedicated to curbing the rate of population growth are on the increase. A campaign to reduce U.S. population growth to zero is gathering momentum. The idea of limiting sharply the size of families appears to be taking strongest root among young people, particularly on college campuses: It has been reported that student chapters of Zero Population Growth (ZPG) were to be found on 50 campuses by the end of last year.

But the drive to stop population growth encounters resistance from several quarters and for different reasons. Various institutions oppose artificial contraception and abortion on religious and moral grounds. Some militants see the advocacy by whites of birth control centers for the poor as an attempt to eradicate the black or the poor populations rather than meet their needs. And efforts to stabilize the U.S. population now are seen by some experts as premature and liable to create more problems than they solve. They would recommend that a more cautious approach be taken by Government and they tend to support the continuation of established policies.

One very important aspect of population growth that could be readily changed by legislative action is immigration. As indicated earlier, immigration now contributes almost 20 percent of our total growth. If the American public chooses to control our overall growth through deliberate policies, immigration policies would have to be brought into the picture.

### The Choices for Public Policy Regarding Distribution

The problem of distribution of our population, of excessive growth in some areas and stagnation elsewhere, may be more readily susceptible to policy influence than growth itself. Distribution may also be the more pressing problem. Here again the country faces an important though very difficult and complex choice: Whether to allow existing trends to shape the future distribution of population, or whether to seek a different spatial distribution of the population by means of a decisive public policy.

The trend toward concentration of population in a megalopolis has been dominant, although there have been some breaks in the trend during the past decade in that many smaller cities outside of a megalopolis have shown remarkable vitality and growth. Unless there is a countervailing

effort made to capitalize on the breaks in the trend and to reverse it, this trend will likely prevail, and more than half our country's population will live in "Bos-wash, Chi-pitts and San-san" by the year 2000.

This trend continues in part because of the strong economic and cultural attractions of the large metropolitan areas, but also in part because of policies—including Government policies and program expenditures—that tend to reinforce existing concentrations of population and economic activity.

Hence, the choice of no change in public policy as discussed earlier in this chapter, would run the high risk of bringing about the kind of future in which the communities of both urban and rural America would further deteriorate. It means that hundreds of American towns will continue to lose young people and economic opportunity; and that the large metropolitan areas, already burdened with social and fiscal problems and characterized by fragmentation of governmental responsibility, may reach a size at which they will be socially intolerable, politically unmanageable, and economically inefficient.

On the other hand, there is the choice of decisive public policy and action to achieve a different and more promising future for the country as a whole. The objective of this choice might be to promote more balanced demographic growth in order to affect positively the quality of life in both urban and rural America.

To promote the objective of balanced national growth, several basic strategies have been proposed by various experts: (1) Spread population by generating growth in sparsely populated rural areas. (2) Foster the growth of existing small cities and towns in nonmetropolitan areas. (3) Build new cities outside the large metropolitan regions.

*Population Spread.* A population spread strategy would attempt to keep population in the countryside and small towns by encouraging the location of factories in these towns, by supporting labor-intensive rather than highly automated farming operations, and by making various Government capital investments in the sparsely populated areas.

Proponents of a spread strategy suggest the improvements in transportation and communication have reduced the historical advantages of industrial location in the larger urban areas. These advocates also contend that urban areas breed more crime, alienation, and psychological problems. They argue that except for economic pressures, many city dwellers would eagerly move to the country.

The argument against this strategy is as follows: Rural areas generally are losing population because economic growth necessarily takes labor away from agriculture and other primary industries based in rural areas and very small towns. Efforts to locate modern growth industries and services in thinly populated areas are bound to be ineffective, because

very few find highly profitable locations or sufficient "externalities" or amenities in sparsely populated rural settings; almost every experiment of this kind has had disappointing results. Efforts to retain rural and small-town populations by providing them with public services substantially equal to those in larger settlements will also prove costly, since the per capita cost of schools, roads, hospitals, sewerage, and so on, is thought to rise rapidly as population density falls below a certain level. Although economic vitality can be provided in some rural areas through industries that do not require economies of scale or an urban location—such as tourism and recreation—the prevailing view among economists is that efforts to promote self-sustained growth in sparsely populated areas are doomed from the start.

*Alternative Growth Centers.* A second approach to economic and environmental problems to both the urban and rural populations is an alternative growth-centers strategy that would encourage middle-sized communities (usually upwards of 50,000—but as small as 25,000) which are growing or which have the potential for self-sustained growth. A growth center is defined as a place whose purpose is to provide new jobs and to have strong ties with the surrounding rural area. Under this definition, growth centers would be cities (outside the congested metropolitan belts) that are having the greatest beneficial effects on the lagging region; i.e., providing new jobs and attracting migrants from the surrounding region who would otherwise settle in the larger cities. Such centers could draw population and economic activity from the great urban regions. Reduced vulnerability to massive problems such as power system failures and transportation strikes would be another strong advantage to dispersed population centers.

Advocates of this approach point out that the most important single influence producing growth in certain parts of rural America in the 1950's was physical proximity to metropolitan areas. Proximity allowed rural people to commute to jobs in the city and also permitted the dispersal of metropolitan activities and residences into the countryside.

The growth center strategy would promote economic activity (notably, job opportunities) at the population center on the theory that it would spread to the rural periphery. In this way, the sparsely populated rural areas could be tied to the growth centers in a mutually beneficial relationship. At the same time, these centers would provide promising opportunities for more balanced growth and distribution of the Nation's population. They could comfortably absorb natural increases in their own populations, and with outside developmental assistance, could siphon off rural and foreign migration that would otherwise flow to the large metropolitan areas. They should also attract some population and industry from the heavily populated urban areas.

It would probably be necessary to promote the development of these alternative urban centers through some redirection of public expenditures and new forms of partnership between the public and private sectors as well as through possible major increases in public outlays. Indeed, some redirection of expenditures may be crucial to assuring that balanced growth will be realized, since otherwise we will continue to have vast expenditures competing for the realization of conflicting objectives.

The growth centers concept may also find useful application within the large metropolitan regions themselves. Thus, to change the sprawl of urbanization into a pattern of metropolitan communities capable of supporting high-quality services in health, retailing, the arts, entertainment, libraries, and adult education, and of providing a real community framework for civic and political action, planners have proposed strengthening a dozen or two partially distinct communities within the various metropolitan regions. New metropolitan communities would be formed by clustering most of the major metropolitan facilities of those areas in a main center, a modern "downtown" for each metropolis. Typically, the facilities would include 10,000 to 30,000 office jobs, one or more colleges, a major hospital, several department and specialty stores, theaters, a museum, a concert hall, and a central library. Around this center would be a large percentage of the apartments needed by the residents (primarily without children) of the area.[6]

*New Communities.* New communities (towns, cities) are a third possible major strategy suggested to promote balanced growth and better environment. New communities, their supporters argue, would save money through efficient design and construction of facilities, improve the quality of life by developing an adequate sense of community, and maintain a style of life that would provide adequate and reasonable open space, beauty, and recreational opportunity. This is indeed an attractive vision with which to look forward to the next three decades. Unfortunately, this vision may be very difficult to realize.

Within the next 30 years new communities would not be able to absorb more than a small percentage of the urban population, simply because the rate at which such communities can be planned, financed, and built is limited by many economic and institutional factors. Such limitations include the need simultaneously to balance the demands of employers for labor; the demands of employees for housing, shopping facilities, schools, hospitals, and recreational facilities; and the requirements of suppliers of all these services for enough customers to maintain economic viability. These limitations generate difficult logistical problems. As a major strategy to accommodate a projected population increase of 100 million by this way alone would require building a city the size of Tulsa, Okla., every month until the year 2000. Even if the lower projections of population

growth are correct, the number of new cities needed would still be beyond our capability.

Another complicating consideration is that new towns, if improperly designed, could aggravate the problems of the cities by siphoning off primarily middle and upper income residents, leaving the poor behind in cities stripped of their tax base. So far, most new communities have been developed in areas of rapid urban growth, or perhaps more accurately suburban growth, and have neither benefited many of the poorer residents of central cities nor contributed to the dispersal of population centers.

Some experts seem to favor an experimental approach to new community development. According to this approach the new communities would be limited to a small manageable number that could be studied closely over a time. Into these could be introduced a rich variety of social and physical innovations.

Much of the advanced thinking and designs of new town planners may also be applied to existing urban centers. In fact, the Department of Housing and Urban Development has already broadened the concept of "new communities" to include building on, or next to, existing growth centers.

The several alternative strategies discussed, to be sure, are not mutually exclusive. The strengthening of urban growth centers outside large metropolitan regions can help to achieve balanced national growth; the development and prudent placement of some new communities would also help. But redistribution of the U.S. population is a problem of immense proportions, one that will place great demands on public policy and decisionmakers. The Federal Government, working closely with the States and communities, can wield immense influence in bringing about the desired demographic and environmental changes. But the government will need to understand the implications of bringing about the desired changes in terms of commitment of resources (public and private) and difficult tradeoffs that would have to be made with other desired objectives and priorities. There is still much to be learned about what constitutes satisfactory levels and rates of change in population in various parts of the country. Studies are needed to define what would be lost and what would be gained by adding population and what policies might succeed in guiding population growth.

## Summary

**In a nation that once valued its population size and growth, and in which the phrase "fastest growing" was attached to the name of proud municipalities, the question of overall population size and distribution has come under active debate.**

The question of population size in the United States is not Malthusian. The issue is not whether we can feed and clothe a population of any size we can realistically envisage, or even supply it with the expanding amount of energy it may demand. It is rather that of whether a technologically advanced and industrially prosperous nation wants, or can continue to pay the price of congestion and contamination that comes from our overall affluence. It is suggested that our size may be limited by the ability of the environment to absorb the wastes that result from our economic success.

Students of the overall size of our population are in no agreement as to precisely what the size will be by the year 2000, nor on what an optimum population size for a nation such as ours would be. But, more recent projections suggest that the increase in our population over the next 30 years may be considerably less than the additional 100 million that had generally been forecasted. In fact, it may even be that the present rate of increase will slacken off so that we will reach the zero growth rate that some demographers have been advocating.

However, the issue of population distribution is a different matter, and one to be taken seriously regardless of what may be the upper limit of the population size. Our population has been concentrating increasingly, not only in cities, but more and more proportionately into a few rather large urban masses. This has resulted in a lowering of the quality of life in both urban and rural areas. Projection of such a migration pattern is actually a de facto distribution policy since it will affect such decisions as industrial plant location and other types of investment which will make the prophecy of increasing concentration self-fulfilling.

We have before us a set of decisions. One which appears not to be urgent is that of overall-size of the population—even after the effects of a considerable amount of immigration are taken into account. Apropos of population distribution, we need to decide on whether or not we will adopt a deliberate strategy to encourage internal migration to negate the forecasts of ever-growing urban congestion in a few megalopoli. A viable option for such an alternate strategy is a policy of encouraging growth in alternate growth centers away from the large urban masses, coupled with a complementary effort of the use of new towns.

FOOTNOTES

[1] 1965 Report of the Committee on Population of the National Academy of Sciences—National Research Council, "The Growth of U.S. Population."

[2] Coale, Ansley J., "Should the U.S. Start a Campaign for Fewer Births?," *Population Index,* vol. 34, no. 4, October-December 1968.

[3] Based on data in U.S. Bureau of the Census Current Population Reports, series P–25, no. 415, January 31, 1969, table A–2.

[4] Davis, Kingsley, "Population Policy: Will Current Programs Succeed?", *Science,* vol. 158, no. 3801, November 10, 1967.

[5] Hardin, Garrett, "The Tragedy of the Commons," 1968 Presidential address to the Pacific Division of the American Association for the Advancement of Science, reprinted in *Science,* vol. 162, no. 3859, Dec. 13, 1968, pp. 1243–1248.

[6] *The Second Regional Plan: A Draft for Discussion,* Regional Plan Association, New York, New York, November 1968.

## Chapter 3. ENVIRONMENT

One of the major reasons for considering questions of population size and distribution pertains to the capacity of the environment to support growing numbers and concentrations of people, and their increasing wealth.

In this chapter, the nature of the current concern for environmental problems is outlined and some options for dealing with the problems are explored.

There are two ways to look at man in relation to his environment. He can be seen either as a creature standing apart from nature and acting on nature, or as a part of nature, a being linked up in the earth's life-supporting system of air, water, soil, plants, and animals. These relationships between man and the surrounding physical and social environment become easier to understand if man is recognized as a part of nature.

Despite the many forms in which environmental issues show themselves there has been little inclination in the past decades to see "man as a part of nature."

No matter which view we take, solving environmental problems will not be easy. In the first place, the necessity for attacking environmental problems has come upon us when the urgent problems of poverty and racial tensions clamor for attention. To many a resident of the urban ghettos, the dirtiness of the air he breathes may seem the least of his problems. Environmental problems are huge in their dimensions but subtle in character. We face a complex of interacting elements that must somehow be dealt with simultaneously; yet Americans are in the habit of dealing with problems singly in step-by-step fashion. Genuine concern for the physical environment is relatively recent, and our understanding of ecology is incomplete.

For the first time in history, the extent of man's activities may be limited not by the scarcity of his resources—food, materials, energy, wealth—but by the problem of disposing of his effluents. Our technological capabilities, while charged with much of the blame for pollution, can also be a key element in solving our problems and in enabling man to live in harmony with his fellow man and with nature. Protecting and improving the environment will require the use of some of the Nation's productive resources, but this will be offset by the hard-to-measure but real benefits anticipated to flow from the achievement of a higher quality environment.



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In both the public and private sectors, and in cooperation with other nations, a broad range of policy options is evolving. Policymakers must proceed deliberately, but with dispatch, and will find it necessary to work in new and as yet undefined institutional relationships.

## Historical Development

Before the middle of the 19th century the American attitude toward nature evidenced a variety of notions. Man was viewed as part of nature only so long as nature was more or less in its virgin state and man did not have the means to significantly impair its balance. More characteristically, the American attitude toward nature was one of subjugation. As is pointed out at various times in this report, the early goal of this country was to wrest from the environment the riches with which it was endowed.

By the time of the Civil War, the exploitative attitude toward nature had become well formed. The adverse implications of America's new mood were shown in 1864 by George P. Marsh's book *Man and Nature; or Physical Geography as Modified by Human Action*. Marsh pointed out that as long as the unrestricted exploitation of natural resources continued, man could not take into account the esthetic, scientific, and spiritual values of nature. Marsh's idea anticipated what was to happen a hundred years later. Despite much discussion, relatively little was done during the rest of the 19th century to curb exploitation.

Under Theodore Roosevelt, the Government began to seek curbs on exploitation. At the first official conference on the conservation problem—the Conference of Governors on the Conservation of National Resources, May 13–15, 1908—many participants doubted that an "invisible hand" would protect the public good when private interests were dominant. During that period concern focused on providing a more rational basis for the use and conservation of the resource pool, but there was little discussion of the deeper consequences of exploitation.

In the 1930's the disasters in the Midwestern Dust Bowl demonstrated how nature responds to human incursions. The calamity received nationwide attention, but even as late as the 1940's, efforts to inform the general public about environmental problems were not very effective.

The 1954 bomb test at Bikini (Operation Bravo) dropped radioactive fallout on Rongelap Atoll, thereby exposing the inhabitants, several U.S. servicemen, and Japanese fishermen to significant levels of radiation. Fish in Japanese markets were discovered to contain fallout radioactivity in measurable, if not genuinely hazardous, amounts, and later oceanographic research revealed that wind and water had spread radioactive material across the Pacific. Where radioactive dust fell into the ocean, the material was absorbed by small plants; the plants were in

turn eaten by small animals; these were eaten by larger animals, and eventually the radioactivity carried to man. [1]

Rachel L. Carson's *Silent Spring* (1962) described the impact of chemical pesticides on the natural environment. The approach adopted by Miss Carson (and other scientists) was new in that it presented ecological arguments; that is, an analysis premised on the effect of chemicals on the cycle of organisms and animal life. Prior to this, analysis of the effects of substances such as pesticides was almost entirely limited to commercial and technical considerations. This new, broader frame of reference for analyzing the effects of technology foreshadowed the "technology assessment" movement discussed in a separate chapter.

The history of DDT illustrates the point that only recently have we, as a Nation, become increasingly able to understand ecological processes. In the early 1940's, this chemical compound was discovered to be a long-lasting pesticide that was apparently harmless to all higher forms of life, including man. Before 1952, no effective and reasonably economical technique existed for detecting the presence of DDT in small quantities even though field studies had shown that the substance was lethal to forms of life other than the insects it was intended to kill. In 1952, the gas spectrochemographic technique was introduced, and this provided a method for detecting many substances in concentrations of one part per million—or even less. The procedure made it possible to determine the extent of dispersion of DDT and to begin to understand its effects on birds and fish as well as to insects. The technique also revealed the previously unsuspected fact that DDT was unlike most other complex chemical compounds in that it was highly resistant to degradation. We know that much of the DDT ever used is still in existence and now has been diffused throughout the world. Further investigations have revealed that DDT in relatively small concentrations can interfere with the reproductive processes of fish and birds. DDT is still "safe" for man but not for his environment.

Miss Carson's work on persistent pesticides gave currency to what now has become a household word—ecology. Ecology teaches that substances released into the environment move in pathways or "cycles" and often return in highly concentrated form, perhaps to threaten man himself. These agents can affect many different species of plants and animals. If a poison kills many of the animals which regulate the populations of certain other species, these other species may then become new pests. At the same time, the old pests may evolve new ability to survive the poisons, then transmit the poisons to other beings.

These and other ecological principles add up to a highly complex view of the world, which in the past decade the informed public has come to share with the ecologists. One may speculate that this view will

condition the public to accept the complexity of all processes including the social, and thereby influence its attitudes in a basic way.

In the 1960's, there were signs that we were increasingly disposed to pay attention to ecological considerations in formulating public policies. The effects of large-scale industrial production were being observed in the air, water, and soil. In 1967 the Committee for Environmental Information and its monthly magazine, *Scientist and Citizen,* was started. Similar groups appeared elsewhere throughout the country, starting with the Scientists' Committee for Public Information in New York City. The Scientists' Institute for Public Information was set up to coordinate the activities of city committees involved in this.

Public concern has been matched by official action. The tempo of public concern accelerated in the late sixties and came on with a rush at the very end of the decade. The environment was the subject of repeated cover stories in national magazines. Even businessmen, normally wary of government interference, called for government action so that they might take antipollution steps on an equitable basis. Initial government action included the Clean Air Act of 1963, and the Federal Water Pollution Control Act of 1965. In recent months, the President has taken a number of steps to deal with environment issues. He established an Environmental Quality Council (May 1969), signed the National Environmental Policy Act of 1969, and forwarded to Congress a Message on the Environment (February 10, 1970), outlining items ranging from the authorization of funds for municipal waste plants to establishment of national air quality standards for air pollution. The National Environmental Policy Act established a Council on Environmental Quality, and the original Environmental Quality Council remains as a Cabinet Committee. In addition, the planned reorganization of the executive branch will create a new agency to systematically combat the problems of the environment.

### Nature and Scale of Environmental Questions

When man disturbs an ecosystem with chemicals, he invites penalties to the system as a whole. Thus, the nuclear testing on Bikini Atoll raised radioactivity levels all over the world. The use of DDT for malaria control resulted in development of resistant strains of mosquitoes, and caused increased concentrations of the chemical in other creatures until it was found in penguins of Antarctica.

To adhere to a narrow technical or commercial approach to the problem of human and social life without paying due attention to ecological laws and human needs is to court serious trouble. The so-called environmental crisis began when human senses detected the unacceptable consequences of pursuing such a narrow course. However, we have

learned that environmental problems extend well beyond our ability to personally sense their presence. For example, carbon monoxide, which is neither visible nor odorous, is one of the more deadly of the substances emitted by our technology. The crisis has focused attention on the system that produces the technical know-how and on its economically advantageous but environmentally destructive output.

New York City today is less densely populated than it was 50 years ago, but on work days is now far more congested than it was then. This crowding is not just a matter of too many humans to the square mile, but of the enormous retinue of energy and material that now accompanies each person. It is conceivable that if the population of the United States were to decrease while technology and production continued to increase at the same rate as today and to be concentrated as imprudently as it is now, a small fraction of the present U.S. population might destroy the physical environment while jostling one another for room.

In a system in which man is viewed as *part* of nature, throughput of materials is regarded as something to be minimized rather than maximized. The essential indicator of success in this view is not production and consumption, but the nature, extent, quality, and complexity of the total capital stock, including state of the human bodies and individuals in the system. According to this ecological view, the use of narrow criteria of immediate economic benefit as the sole measure for assessing the effectiveness of science and technology is hostile to the qualitative purposes of man, society, and nature.

Instances of this conflict are now met at every turn. While technology is successful in producing material goods, it is often incompatible with the natural systems that support human life. Environmental pollution control is usually presented as an engineering problem of physical transfer of residuals from a production process to a sink, but the human ecologist sees the problem in terms of man's relationship with delicately balanced life-support systems.

Resolution of these problems depends not only on the ability of technology to maintain the earth's ecological stability, but also on the resolution of economic, social, and political issues. Serious social judgments, some of which are discussed below, must be made; this is a responsibility that does not belong alone in the hands of scientists, technologists, entrepreneurs, bureaucrats, or other special interest groups, but with all of us.

## Options in Solving Environmental Problems [2]

Waste flows, pollution, and environmental degradation were once regarded as isolated, exceptional problems. Now some scientists view them as inseparable from economic activity.[3] *All* inputs into the processes of production and consumption (except for those which become embodied

in permanent capital items) must ultimately become waste. This includes the energy of production which results in waste heat and another new term, "thermal pollution." Traditionally, most of this waste has been dealt with as material to be discarded at the lowest cost, usually by disposal into our common resources of air and water. But it has recently become obvious that these common property resources can no longer assimilate the wastes our society dumps into them.

Some analysts now suggest that even a small rate of growth for either population or economic activity level could eventually lead to an environmental doomsday. In fact, both population and economic activity have grown in the United States in recent years, so, according to this model, our situation is worsening on both counts. Industrial growth provides affluence but the growing spillage of waste further burdens the earth's biosphere, and adds to the possibility of "doomsday" outcome.

The fallacy of the "doomsday" model is its assumption that we are not able to make improvements in the relation between the amount of goods and services produced and the waste that results. In opposition to the "doomsday" model is a "paradise-regained" view. The paradise-regained model accepts a positive commitment to restoration of high quality to the total natural environment. To achieve a paradise-regained model is to arrest the damage now being done to the environment and move toward correction of previous damage. One important variable in the long run is population growth. (See chapter on "Population.") Other benefits could be achieved through improvements in technology, waste management, recycling and patterns of consumption.

Other variables which may be more difficult to modify, but which are also critical, are the level of consumption and the level of GNP. An aspiration for ever-rising consumption is deeply ingrained in the U.S. value system. Steady growth in GNP is generally accepted as a measure of performance or progress.

Achievement of the "paradise-regained" objective would require deep changes in our value systems and our way of life. In its extreme form it would require returning to a pre-agricultural economy. This is hardly likely, even if it were possible. Happily it is not necessary to accept either the doomsday or paradise-regained views; other options are available.

## A Basis for Policymaking

There are solutions available between the "doomsday" and "paradise-regained" models. Such solutions could take the form of (1) changes in our present production, service, and consumption functions; (2) the treatment of wastes; or, conceivably (3) more skillful reliance on the natural processes of the environment itself; or, in addition, (4) generating further protective measures to reduce the impact upon waste

receivers. Action could include capital investments, transmission of information, establishment of criteria and the setting of standards, imposition of effluent charges, and the use of regulation for managing the impact of wastes on the ecosystem.

The real choices to protect the natural environment lie in how we balance those combinations of production and consumption processes, waste management practice, and use of existing natural processes within the environment.

Progress toward the formulation of appropriate policy will depend upon better understanding of ecological processes, and the criteria for survival and success in the evolutionary process. All that now is available for a general approach is imperfect knowledge, but America must do the best it can with the understanding at hand.

Certain theoretical concepts are emerging which may provide a basis for holistic policies. The Second Law of Thermodynamics, for example, is said by some to be a key element in an evolving environmental philosophy. This law states that the entropy (roughly a measure of disorder) of a closed system will always increase until equilibrium is reached. All systems tend to run down.

To offset the disorder arising from entropy, ecological processes contain built-in evolutionary tendencies. In nature, there are movements from simple to complex life forms, from simplicity to diversity, from few to many life forms. Driving these movements is the inclination of living systems to reduce entropy (disorder) and to foster order by making *useful* energy always available.

A full understanding of such ecological processes, and a recognition that man is a part of them, could provide an improved basis for decision-making. Concerns of environmental managers are now with matters such as beer cans, eutrophication, and planning vs. no planning. In the near future, we may see concern for the development of strategies for maintaining the ecosystem in what may be called a "steady state." Pollution, for example, could be interpreted as a disturbance of the ecological equilibrium of the world system in which a balance is not being maintained between heat loss and gain, in the chemical composition of the oceans, and between predators and prey. The nonpolluted environment would be seen as one which resists or accommodates disturbances. An ecological system free of pollution would probably not be an unchanging one, but simply a system in which the cycling is controlled rather than out of control; in which disorderly energy flows are decreasing, not increasing; in which systems are developing better checks and balances; in which diversification is increasing; and in which instability is giving way to stability.

The idea of evaluating current technical or economic alternatives with

concern for long-run ecological balance—to minimize the tendency toward potentially disastrous disorder in the earth's life-support systems—could be one of the milestones in modern thought.

The principles and technologies of computer simulation, and the management and information sciences when applied to the ecosystem, provide the tools that would enable us to substitute *systems* guidance in place of our present narrow view of the management of the separate parts of our environment.

The growing knowledge of cybernetics and the field known as general systems theory offer some reason to hope that measures can be developed. This view of nature as a creative, interacting process in which man is involved with all life forms, includes consideration of present "externalities" or unwanted costs as realities of the biophysical world.

The relationships in the ecosystem must be recognized as complex and fragile, with any given intrusion likely to have effects beyond the original source. This view forces the recognition that choices be evaluated not solely in terms of growth, but also in terms of impacts on the stability of the life-support systems of the ecosystem.

An example of the factors tending to disturb our natural environment is combustion, the rapid chemical reaction of oxygen with carbon, upon which civilization depends for usable energy. Since the demand for electric power is increasing relentlessly, would-be ecosystem managers confront a real dilemma. Power-production capacity in the United States may be headed for an almost eight-fold increase during the next 40 years—unless our priorities and policies change. Nuclear energy, often hailed as the answer to air pollution by coal-burning powerplants, may not overtake energy from coal until the late 1990's, even if economical breeder reactors are developed in the near future. By then, coal consumption by the U.S. powerplants will be three times what it is today. The gaseous emissions from burning coal are already exacting a serious toll upon the environment; by 1990 they would be far more severe if nothing is done to control them. And when nuclear power becomes widely available, the problem of thermal pollution must be solved.

If the environment of our spaceship Earth is to be managed effectively, policies must be developed for resolving the conflict created by public demand for products and services such as power and the growing need to control the pollution created by power production and other output. Technology assessment procedures might help to resolve these dilemmas, if designed to make sure that broad public interests (such as reducing air pollution) as well as private interests are considered. Technology assessment procedures could foster the development of new systems of production that might enable technology to make a better contribution to our society's welfare.

## Quality of the Environment and the Economy

Although the contamination of our surroundings can be decried for moral, aesthetic, and health reasons, the resolution of pollution problems will inevitably involve economic policy. This resolution can be effected by research on the causes and consequences of our imposition on the environment and by political cooperation between the public and private sectors on the policies research devises. Solutions will take time and may cost much, but they can be brought about within the market system as now basically constituted; properly stimulated, the market itself can be among the most powerful tools in a program to alleviate the physical degradation of our surroundings.

In the past, the air and water have been readily available for any purpose. Our production and consumption activities could be carried out without particular concern for conserving our natural gifts.

But as production and consumption have risen (along with population) more and more impositions have been made on the air and waters. These incursions are the consequence of economic growth and the notion that the environment is available at no cost for whatever use we want, including that of disposal of the wastes from economic activity. Thus, when we impose on our air and waters in ways and amounts that use up these necessities, we levy a real social cost. These resources are no longer free to society.

Because private use of the physical environment is available at no cost, the market system which allocates resources operates imperfectly. The imposition made by the individual firm or consumer when waste is spilled does not constitute a purchase by the firm of a unit of its surroundings; therefore, using up the environment is not counted as a cost of production. The supply-and-demand mechanism of the market does not make its adjustments nor allocate resources with full information about all costs that are in reality being incurred by society. With full cost information added to conventional business costs, the supply-and-demand system would channel resources and consumption activities in magnitudes that approximate the best balance of economic activity and pollution.

To attack pollution requires a balancing of the costs of imposing on the environment with the economic benefits obtained from the associated production and consumption. Total prevention of fouling the environment is not achievable. Therefore, a policy goal for "balanced growth" should be to find and enforce a degree of pollution control at which the costs of more control (i.e., prevention) just equal the benefits (or where the quantity of output is balanced by the improvement of the environment). This degree of control, however, must be continually reappraised in light of technological advances and human needs.

A necessary step in forming an antipollution policy would be to determine the costs of pollution. Some costs of environmental degradation, such as the corrosion of buildings by airborne pollutants, are easy to assess, but others are not easy to trace; the links between pollution and disease and the nonmonetary costs from the loss of aesthetic appeal are far more difficult to calculate. But among the most difficult of all costs to assess are those to the ecosystem of the Nation or the world. Considerable and difficult research is needed to provide necessary cost information; much of it is not available today.

Improving information is only a first step. Policies to effect the desired control are the second, but it is most likely that large programs will have to be started without full data on costs—the urgency of the problem will not permit the luxury of waiting for such information.

Much has already been done to reduce industrial pollution, and there is a variety of means available to accomplish more. Direct regulation of polluters and the enforcement of specific standards, as codified by the Clean Air Act of 1963, and the Federal Water Pollution Control Act (as amended) are the principal elements of present policy. Government might also provide subsidies to firms; for example, by tax incentives to stimulate the purchase of equipment with antipollution features. But subsidies (and the enforcement of regulatory standards) require intervention and monitoring by administrative agencies, and the subsidy policy itself raises issues of tax equity: Taxes must be collected to pay the subsidy and it is not clear that fairness is served by imposing them on all taxpayers, including non-polluters.

Another approach favored especially by economists would be to put prices on pollution. Those who regulate the health of the environment would impose costs (say by direct charges on discharge of pollutants) for contaminating the environment. In other words, the presently hidden social cost of pollution would be made a real dollar cost and assessed to the offending firms, consumers, and municipalities. These costs would then show up in the supply-and-demand relationship that regulates the market system, and the market would then be able to adjust itself to amounts of production, consumption, and pollution believed socially tolerable. Setting the appropriate "price of pollution" would be no simple task, but within broad limits an imperfectly set price is likely to be preferable to no price at all. This policy would bring about a more perfectly functioning market, one that would have both the information and incentive to reduce the environmental problem.

Putting prices on pollution would raise the cost of polluting; that is, of using our scarce resources of air, water, and land for disposal purposes. In the competitive marketplace, raising the price of pollution would tend

to lower environmental degradation, as producers would have an incentive to use manufacturing methods that put fewer burdens on the environment. And higher prices for the products that dirty the air and water would induce households to alter their buying habits, tc switch to goods and services less likely to cause pollution when they are produced or consumed. Business would be given an incentive to supply products that could be consumed without creating pollution. And with costs and prices adjusted to show the effects of pollution, the issue of equity and fairness would be resolved.

In some instances government action to increase the capacity of the environment to absorb wastes may be cheaper than reducing the creation of waste. Rivers or streams could be augmented or controlled for this purpose, and specified water courses designated to receive pollutants, while others would be protected.

An extreme solution would be intentionally to lower the rate of conventional economic growth. Such a proposal assumes that growth is the cause of environmental degradation and therefore that the cure is to soften the cause. But degradation of the environment is not a necessary consequence of economic expansion; and improving the environment will itself require new equipment—equipment that will be available only from increased output or from diverting resources from other users. Moreover, there is no guarantee that restricting growth would, by itself, reduce pollution; costs and prices—the "signals" of the market—would also need adjustment. Restricting growth would also run counter to other policy objectives: Slowing the rate of expansion would jeopardize full employment, and would hinder the efforts of minority groups and those in poverty to increase their income. Thus, while it may be true that pollution can be associated with growth, it does not follow that consciously curtailing growth represents sound policy.

The diversion of equipment and manpower into cleaning our physical surroundings could lower the country's apparent rate of growth. Although equipment purchased to purify wastes enters the GNP as investment, with full employment, this diversion would probably lower the investment in machines that are more directly productive of marketable output. In time, and if the change in the mix of investments were substantial, the apparent growth rate of the economy could lessen.

The conventional GNP accounts make no allowance for improvements or deterioration of the environment or of the quality of most private products. Since quality changes or increases in benefits are not measured when the air and water are cleaned, these improvements will be unregistered by usual economic accounting methods, just as in the past environmental deterioration has gone unmeasured. It is therefore possible to conceive of some lowering of the conventional growth rate,

but at the same time some increase in real wealth if GNP were adjusted for the quality improvement being newly purchased.

Even if some increases in output are sacrificed to serve the purposes of cleaning the environment, this would hardly represent a new event in American economic life. Quantity has been typically modified by concern for quality, and to suggest that ours is an age where the two are in opposition is to misread history and current events. The sacrifice of income in favor of leisure, and the large portion of current output that is used instead of invested, show that quality (leisure) and current enjoyment (consumption) demonstrate that sheer economic growth for its own sake is not and has not been an absolute concern. Therefore, caring for the wholesomeness of our environment can be considered an extension of America's historical concern for quality.

## Options for Policymaking

Two broad and complementary approaches to policymaking for improving our environment are available. We can undertake corrective actions to reduce the social costs or externalities associated with wastes, or we can seek alternatives to prevent or reduce wastes from materials used in the process of production and consumption; and both approaches could be taken together.

*Corrective actions* might include the treatment of water to reduce or eliminate pollution, and the compression and relocation of solid waste from one location to another. In a broad sense, attempts to alleviate pollution from the production of wastes could be classified as corrective actions.

In the *preventive actions,* the aim is to avoid or minimize the creation of residuals from the production-consumption process, rather than treat them after they are formed. Preventive actions include the alteration of input to reduce leftover waste at the end of the process, and the development of new uses for residuals to make them useful by-products.

Whether the corrective or preventive approaches are used, the assessment of the impact of technologies can and should play an important role in considering options for improving the environment. (See chapter on Technology Assessment). In the case of corrective actions, the purpose would be to assure that a technological means to cut a particular abuse would not create other abuses that might not be foreseen. In the case of preventive action, technology assessment would usually occur in advance of the application of either an existing or a proposed technological application.

To improve the environment, the Government has such options as

regulation, the establishment and enforcement of standards based upon criteria, emission taxes, and subsidies. Generally, current policy has been toward the identification of criteria and standards. This approach recognizes that we must reduce our environmental abuses, but it tends to place heavy emphasis and importance on traditional policymaking criteria; namely, technological capability and economic feasibility.

Regulation going beyond such criteria and standards in general has not been undertaken to any great extent. In part, this has been due to lack of information about the intricate relationships of production and waste disposal. In particular, there are uncertainties about transformations occurring in the environment in handling residuals and regarding the impact of residuals on places of disposal.

Ecologists now have considerable information about individual events and some short-term predictive abilities, but scientists are only beginning to understand life, the viability of support systems, and long-term ecological processes.

Regulation, if applied more stringently, would have the direct effect of eliminating or more drastically reducing waste. Initially this probably could reduce the flow of goods and services that we now generate. Advance notice of regulation might greatly stimulate the improvement of technology that would reduce the flow of residuals, especially if there were additional Government support of research and development. In any event, some regulation in the interest of general health, safety, and welfare is essential; e.g., limitations on exposure to radiation.

Recycling and the development of new uses for waste has so far not been emphasized by many policymakers, but already there are cases in which a material that was once a waste has become a valuable by-product. And, the potential of recycling was emphasized by the President in his message on the environment.

Taxes on emissions have been discussed but not generally applied in the United States. An emission tax, to be effective in reducing pollution, might be higher than the cost of eliminating or treating the effluent discharge. Such a tax would place the cost of eliminating or treating the residual on the producer.

Emission taxes would serve to ration undesirable products and would tend to avoid arbitrary regulating intervention.

Tax credits or other subsidies might be provided to aid present polluters to prevent or treat waste discharges. Although the stated purpose would be to limit or control a waste product, subsidies would require nonpolluters to bear a larger proportion of the tax burden. Aid to polluters for reducing their pollution could come only from reductions in other Government services or increases in taxes.

The full solution of environmental problems can, in the long run, only

be achieved on a global basis. Thus, cooperation among nations is essential. Within each nation, the various levels of government—national and local—must work in concert, and the private and public sectors must recognize that their interests are bound together.

The only life-support system we have for the long run is not our technology but the delicately balanced ecosphere of the earth. Consequently, the critical environmental issue is not how sophisticated man can make his technologies alone, but how well he can use both his technology and his social institutions to maintain a harmonious relationship within and as a part of the ecosystems.

## Summary

**Man is redefining his relationship to his environment. He has progressed from fearing, to understanding, to using, to abusing, and now to worrying about the physical and biological world about him. Throughout all but the very recent history of the United States, our relationship to the environment has been one of exploitation. We have seen our natural endowment as a source of riches to be extracted and used, or, later, to be extracted and processed. Concern for the environment was generally limited to whether or not we were exhausting our inheritance of sources of food, energy, and materials.**

**The current interest in the environment has two distinctively novel emphases. The first is that the limitations that the environment places on our activities may not be on the input side (sources of food, energy, and materials), but on the output side (a place to dispose of our wastes). The second, which is closely related to the first, is that the environment, in addition to having a limited capacity to absorb wastes, is a complex ecological system in which intervention of an apparently minor sort can, and often does, have far-reaching consequences through a chain of unsuspected reactions.**

**Both of these aspects of thinking about the environment have important consequences on the way we think about other things. They raise the question of whether or not there may be an upper limit on our economic growth as a consequence of the limitations on how much waste can be absorbed. And, the model of complex ecological systems affects our whole way of thinking about the consequences of our action not only in the environmental sphere, but also in the social sphere where we are coming to realize that causation is just as complex.**

**Some scientists and other anxious citizens assume a doomsday model of the future in which increased economic production will drive us to our destruction. In response, others propose what is called a paradise-regained model which would return us almost to a state of nature. Fortunately, the doomsday model does not forecast that which is**

inevitable, and the latter, which would probably be unattainable if tolerable, need not be entertained.

A mixed strategy of response to our environmental problems is proposed. We need to expand our inadequate knowledge of ecological systems. But while expanding this knowledge, we must take those measures which we know are called for. We need to consider our current technological and economic alternatives in the light of long-range ecological balance. Additionally, we need to resolve conflicts between our demands for products and services, and the depletion and pollution generated by them.

The market mechanism can and should be used as one of the devices for regulating these demands. Government should play a role through appropriate regulations, taxes, subsidies, and standard setting. Since environmental problems and their solution are of a global nature, we must and are beginning to act in concert with the other nations of the world.

Our environmental problems are a result of our technological and economic successes and of our philosophical view of nature. Now we must learn to use our technology and our economic output better to bring us in harmonious relationship to that environment. As will be found in other sections of this report, it is becoming apparent that the relatively narrow criteria by which we have, in the past, judged technical and economic progress must be expanded to consider a wider range of consequences.

FOOTNOTES

[1] Hines, Neal O., *Proving Ground:* An Account of the Radiobiological Studies in the Pacific, 1946–61, Seattle: University of Washington Press, 1963.

[2] The material on the following pages based upon a paper by John H. Cumberland and James R. Hibbs prepared for presentation before the Institute of Management Sciences at the National Bureau of Standards, Gaithersburg, Md., March 9, 1970.

[3] Ayres, Robert U., and Allen V. Kneese, "Production, Consumption and Externalities," *American Economic Review,* vol. LIX, No. 3, June 1969, pp. 282–297.

# Chapter 4. EDUCATION

**Environmental and population problems are symptomatic of the complexity and rapid change that characterize our society. If balanced growth is to be achieved, the education system faces the challenge of providing people with the knowledge and skills necessary to manage complexity and change. This chapter outlines the major problems and choices involved in achieving this role for the educational system.**

The Nation's educational system has undergone phenomenal growth during recent decades. In the 1969–70 school year, total school enrollment from preschool to postgraduate reached 60 million, and expenditures reached some $63 billion.[1] But these two figures alone do not show all the expansion in the educational system that includes teaching staff, new curricula, new classrooms, new laboratories, and new equipment. More important, these figures do not reflect the reciprocal relation between the expansion of the education system and the rates of growth experienced by many other parts of society.

The expansion of the society has placed a demand on the educational system to produce skilled citizens. In its turn, the educational system has furthered growth by raising the society's level of knowledge and skills. This reciprocal relationship served the Nation fairly well during its earlier stages of development. The success of the educational system depended in part on the rate of social change being sufficiently slow to permit the educational system to adapt its structure and functions in phase with changes occurring elsewhere in the system.

In the sixties, the traditional adaptive capabilities of the educational system underwent severe strain because of the increasing rate of change in society and the new importance of the issue of quality of life. The structure and function of the educational system were unprepared to respond to the challenge posed by such concerns as war, poverty, racial discrimination, urban problems, alienation, pollution, and social malaise. At about the same time, the Nation began to insist on more evidence of accomplishment by its schools and colleges, and started to question many of the traditional assumptions underlying education. Taxpayers joined students in challenging the familiar criteria for assessing schools and in raising doubts about the relationship between existing educational institutions and the needs of the society.

In the view of many, a priority task for the Nation is to reestablish the mutually reinforcing relationship between the educational system and the long-range qualitative and quantitative requirements for development of society as a whole. This relationship is a prerequisite for the harmonious transition of the social system to that richer stage of development to which America aspires in its third century. A better understanding of the relationships between education and society is also necessary to develop criteria against which the educational system's effectiveness may be assessed.

## Patterns of Growth in the System of Education

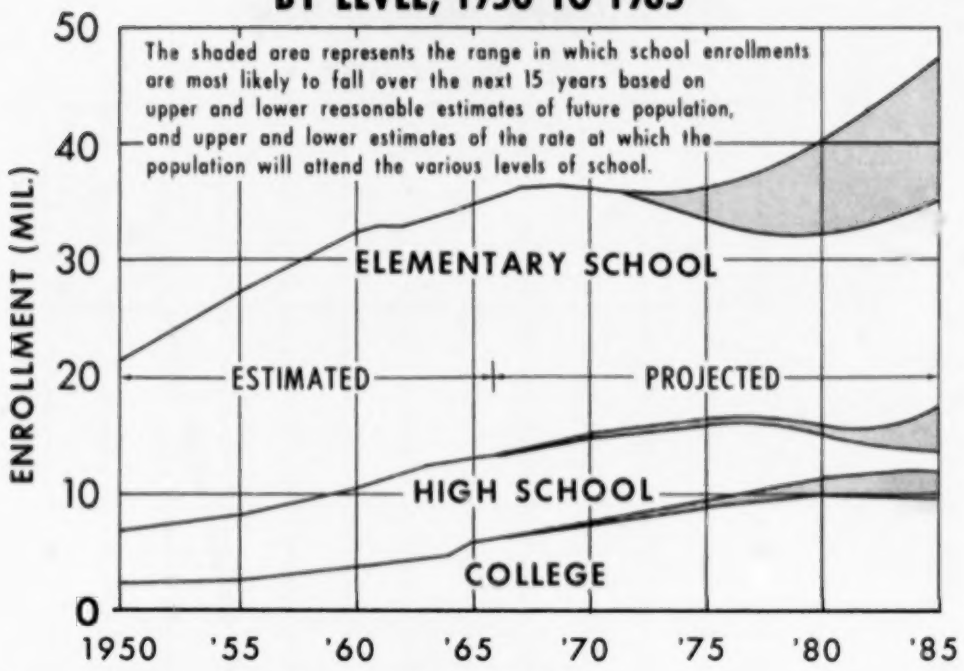
Especially dramatic quantitative growth has been experienced by every part of America's system of education since World War II. But by 1970 enrollments in elementary and secondary schools have virtually leveled off because the surge from the postwar baby boom has been absorbed by those schools. Colleges and universities continue to serve the influx of students born in the postwar years. It is expected that these trends of enrollment, shown in figures 4–1 and 4–2, will continue through the decade of the seventies. Although post-secondary institutions will continue for some time to come to concern themselves with accommodating this rapid growth in sheer numbers of students, elementary and secondary schools are entering a new era, one in which they can relax their traditional preoccupation with quantity of education and concern themselves more directly with improved quality.

Elementary and secondary education has become essentially universal in the United States. In the autumn of 1969, 94 percent of youth between the ages of 14 and 17 were enrolled in high school, as against 11 percent of the same age group at the turn of the century. Postsecondary education now includes about four out of every nine young people of college age, compared with one out of nine in 1945.[2]

Figure 4–3 demonstrates the success of American schools in providing universal schooling. The number of years of school completed is shown for persons aged 35 to 39 at 10-year intervals from 1900 to 1980. Students used to leave school in relatively large numbers either between the 8th and 9th grades or after the 12th. The first point of mass exodus has all but been eliminated, although the second—that between secondary and post-secondary education—still exists. To the extent that the first has vanished, the Nation has achieved universal secondary education; those calling for universal higher education would have us eliminate the second, so that nearly all students would move on to college.

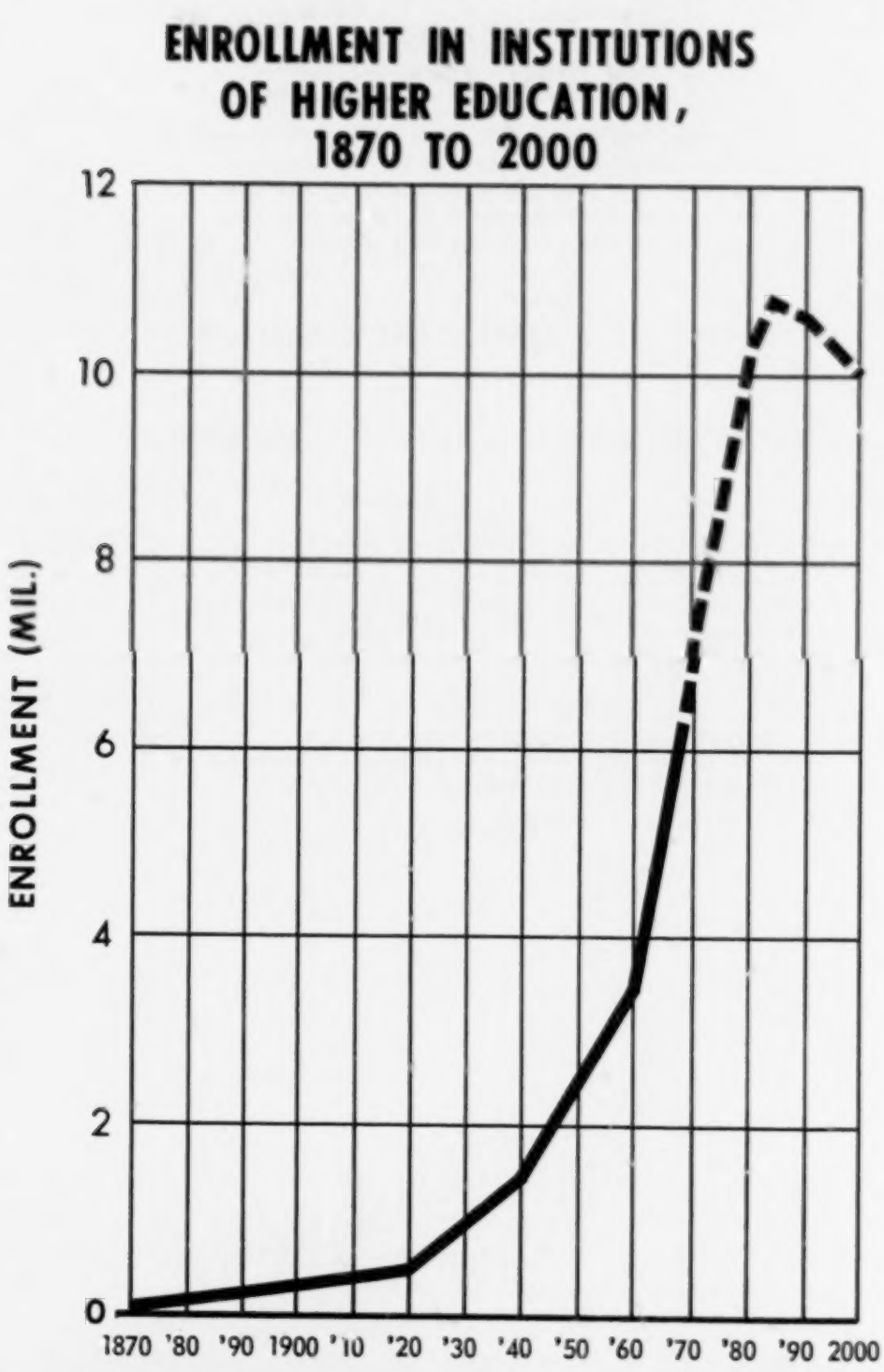
The question of continued growth in American education, particularly insofar as it implies universal postsecondary schooling, poses a substantial issue for consideration: to what extent should the United States strive to increase the *quantity* of schooling, both in numbers of students and

## FALL SCHOOL ENROLLMENT, BY LEVEL, 1950 TO 1985




Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Number 388, "Summary of Demographic Projections," U.S. Government Printing Office, Washington, D.C., 1968, p. 11.

**Figure 4–1**




Source: Quality and Equality: New Levels of Federal Responsibility for Higher Education, Carnegie Commission on Higher Education, McGraw Hill, New York, 1968, p. 4

Figure 4—2

years in school? It is costly both in direct expenditure and in foregone earnings to keep persons in school, so their entry and continuation have to be justified in terms of both society and the individual. Moreover, many people feel that too-great emphasis is already being placed on post-secondary education, particularly on the 4-year degree, and that possibly there are many students now in college who do not really want to be there. Some feel that post-secondary education, as it has been defined in the United States, has little meaning for many in the population. It may be that secondary schooling itself needs basic reforms so as to provide this portion of the population with useful learning experiences, and that college should be deemphasized. In any event, the trend of the last century has been for more schooling for everyone, and the issue is properly joined whether this trend should be consciously continued.

Resolution of this issue and the broader questioning about the relationship of the education system to growth in the society requires understanding of the challenges now facing the schools. The next section considers the way in which American attitudes towards education shaped the development of the system that exists today.

## History of U.S. Attitudes Toward Education

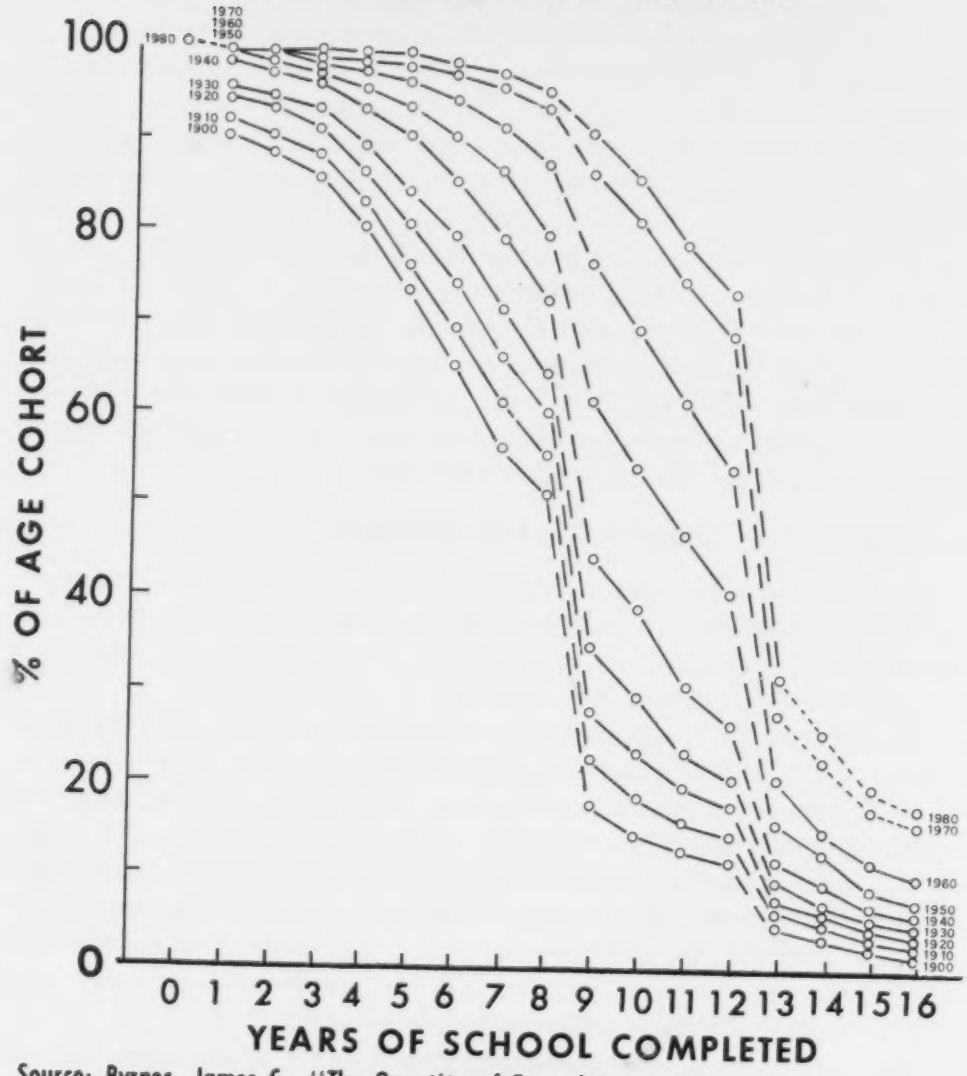
From its beginning, the Nation viewed education as a crucial element in the development of a common culture. Later the growth pattern of the American school system also became a response to, and a stimulus for, the growth of other sectors of society.

During the 1830's and 1840's an evangelistic tone pervaded the arguments of the promoters of common schools, who saw these schools as ways of preserving morality, promoting social order, and fostering economic development. These were the needs of society perceived by educators and the general public as urbanization and industrialization developed through the 19th century.[3] Whether or not the common schools actually achieved the objectives of generating a common culture and polity is open to question, but the belief by Americans in this role was sufficient to support the development of the schools.[4, 5]

The urbanization and industrialization process of the latter half of the 19th century had a direct effect on the development of the school system. A new type of life was necessary as our rural society changed to a largely urban one. Schools were expected to assist in this transformation by diffusing through the population "an emphasis on order, punctuality, reliability and reward according to achievement rather than ascription," [6] that is, according to what a person did, rather than who he was.

In the 1830's and 1840's the educational model was to "*give* each pupil America's special truths," i.e., its democratic principles. By the late 1800's

## YEARS OF SCHOOL COMPLETED FOR POPULATION COHORT AGE 35 TO 39 BY DECADES, 1900 TO 1980




Source: Byrnes, James C., "The Quantity of Formal Instruction in the United States," Educational Policy Research Center, Syracuse University Research Corporation, February 1970

**Figure 4—3**

the accepted goal of education was "to *prepare* the individual so that he could achieve them." In the same period a gradual shift occurred from viewing economic prosperity as a natural consequence of education to viewing prosperity as a measure of the worth of education. The worth could be stated in numbers of students going through the system and the industrial productivity of an educated work force.[7]

Educators continued to stress self-control and self-discipline as primary educational goals. "Children clearly were to be taught to defer gratification and to exercise severe instinctual repression in order to promote both their own good and the good of the society." Even during the progressive period in the early 20th century when the self-fulfillment of the individual was elevated as an educational goal, the administrators, teachers, and general public seem to have continued to stress social discipline over the development of cognitive skills.[8]

Industrialization brought with it a more apparent link between schooling and employment. As early as two decades before the Civil War, 1 or 2 years of high school was considered desirable for commercial, white-collar employment. Teachers were expected to have at least completed high school and educators tried to add normal school as a requirement. At the turn of the century, the great surge in high school enrollment suggested new and stronger relationships between schooling and employment.[9]

The increasing importance of the high school was accompanied by emphasis on the elementary schools as the source of social skills, as well as basic skills in preparation for advanced subjects. Children were to learn "the undergirding habits of modern society: the omnipresence of impersonal rules, the importance of self-regulated achievement toward a superior's goals, a sophisticated discipline of the clock, the ways to compete while seeming to cooperate, and the like." [10] The high school was to be the culmination of the process begun in the elementary grades.

Perhaps the most fundamental change in attitude occurred shortly after the turn of the century when the general public began to equate going to school with education. The major proponent of this view was John Dewey who argued that industrialization had made it impossible for the home, the shop, the neighborhood, and the churches to continue their educative roles. The acceptance of this view led to the schools assuming full responsibility for meeting the Nation's educational needs. As a result, emphasis was placed on years of formal schooling as a measure of educational achievement.[11]

The expansion of the schools in urban America was accompanied by the development of large, organized school administrations. Urban school systems in the East had become large bureaucracies by the 1870's, in response to "a high priority on efficiency, economy, and equity" in

school administration in rapidly growing urban areas. The result was to "create subsocieties: the world of educators, set apart from the rest of society by its own special interest in the maintenance and preservation of the system." [12] Bureaucracy also developed in higher education, as colleges became corporations, building an essentially internal and professional steering mechanism.[13] Strong influence was still exerted from outside, but control basically remained within the educational system itself.

Schools continued to grow through the 1930's and 1940's, but made very little fundamental changes in their goals. Social aims—the development of the child to function in his society—were dominant. By the late 1940's, however, a "skills crisis" confronted the Nation. The "cumulative pressures from an increasingly sophisticated industrial technology, a rapidly deepening specialization in all manner of professions and a spreading request for college degrees from other status-conscious occupations released a national cry for trained personnel." [14] The resolution of the skills crisis changed the relationship between education and success. Where success had previously been considered the reward for individual ability and initiative, it became and remains associated with an advanced degree and specialization.

The turn to professionalization and specialization met the manpower needs of mid-century America as it underwent a technological revolution, one spawned largely by the technical demands of World War II and the cold war. And recent developments portend that in the 1970's the adaptability of America's huge school system will be tested once again.

## Education and Change

To speculate about what these tests might be, one must examine the changing nature of our society and its educational needs. The most critical characteristic of our modern society from the standpoint of education is its rapid change. Education is expected to transmit between generations the culture of a society and skills for people to function in it. But cultural and technological change has become so rapid, particularly over the last decade, that the usual means of transmission may be inadequate. The culture that is transmitted and for which students are trained may not be the one in which the new generation must live.

In times when change was slower, the schools, the family, and the churches were able to shape values, transmit knowledge, and teach skills of use to the society in which the person would function. With industrialization and urbanization, the schools assumed responsibility for education that the family and church were apparently unable to bear. Today the role of the schools themselves is threatened by the changes in society.

The distinguished sociologist James Coleman has pointed out that 100 years ago the schools were the information center and source of vi-

carious activity in a community; words and books were the medium of transmission of information, and a child's cognitive world was built mainly on his direct experience. Modern society, on the other hand, is flooded with information, data, and opinion through mass communication, particularly television. The individual may not be able to use this material simply because he is overwhelmed, or because he has not been properly trained to evaluate it. And, while society has become rich in information sources it has become poor in active participation by youth. The opportunity of today's youth for experience in the adult world is far less than those of 100 years ago when adolescents had to take jobs at 12 or 14 years of age. By contrast, the youth of today stay in school until at least age 16, and spend as much time watching television as they do in school.[15]

Whatever the consequences of exposing youth to such a large volume of ideas and facts, the schools are faced with having to reassess their role. For instance, Coleman argues that the success of the school in shaping values before the advent of mass communication could be attributed to the absence of competing sources. Since the schools can no longer regulate the material transmitted to our youth, schools must consider alternative means of affecting development of values if they intend to maintain an effective role in that development. Probably they must devise means for helping youth integrate the variety of values to which they are exposed.

If the child in today's school is going to be expected to operate effectively in his society when he is an adult, he will have to have cognitive skills to deal with the flood of ideas and facts which he will face. Whereas once the task of the schools was to transmit information, the job today is more to give the student the cognitive skills to handle the information coming from many sources.

In addition to rapidity of change and the flood of communications, the very complexity of modern society poses another challenge to the adaptability of the educational system. The environment chapter of this report, with its emphasis on the many and linked relationships between social institutions and the physical environment, is illustrative of the degree of complexity with which modern societies must contend. Those with the responsibility for making decisions affecting the rate and direction of social change need to be capable of handling such complexity if the social system is to be effectively managed and the ability to manage change is to be learned.

What does this mean for education? Where methods exist for dealing with change, knowledge must be transmitted; where those methods do not exist, the approach and analytical skills by which these might be

developed have to be found. How to respond to these needs of the educational system is the subject of much current debate.

## The Debate About the Role of Education in Solving Social Problems

In their traditional role as a social instrument, schools are viewed as the means by which the Nation transmits its culture and values and teaches skills. But demands are made today that schools change their instructional programs to deal more directly with current social problems. One way in which such demands have appeared is in the accusation of "irrelevance," directed primarily by youth at the colleges and universities for their failing to play a more effective role in helping the Nation solve its pressing social problems.

In an effort to deal effectively with the broad social and technological problems facing society in terms of either instruction, research, or direct problem-solving assistance, the colleges and universities started a large number of so-called "interdisciplinary" programs. A recent study found that:

> At almost every university and at most colleges there is an incredible number and variety of interdisciplinary institutes, centers, and programs on almost every subject of human interest. At one major university we counted 157 such freestanding institutes and centers, and at another major university 126.[16]

The study also found that for several reasons these efforts were largely unsuccessful. The institutes and centers, despite frequently impressive rosters, often devoted their attention to the ideas of one or two men, and therefore did not achieve the breadth anticipated. A more serious problem was the lack of control over faculty rewards and over the course requirements for degrees. Without these controls the allegiance of both faculty and students remained with their usual discipline-oriented departments, and it became impossible for these new organizations to function effectively. In their effort to become problem oriented, the universities found they were crippled by the entrenchment of the disciplinary departments that functioned so well in the past.

While there is little disagreement that our society has complex problems that need new methods for their solution, there is strong disagreement with the position that schools are the institutions which should assume responsibility for finding those methods. Daniel Bell, a sociologist at Harvard University, argues that much of the "recent agitation . . . to have freedom in curriculum, to seek interdisciplinary work and the like . . . is logically and educationally unsound and that we need a greater degree of coherence and training in disciplines already in the curriculum." [17] He goes on to say that the university's primary role should be the traditional one of searching for truth and evaluating the culture of its times.

He feels that the universities should divest themselves of many of the tasks they took up when no one else could be found to do them, such as the defense work of the Massachusetts Institute of Technology's Lincoln Laboratory and the management of the Argonne National Laboratory at the University of Chicago.

What are the choices? On the one side there is a call for direct involvement in society's problems, the teaching of broad skills in problem solving and the promotion of interdisciplinary research and service activities. On the other hand there is the desire to return the university to the search for knowledge for its own sake. Between these two there is a range of choice in the degree to which the universities assume a problem-solving role in society.

Virtually unmentioned, however, by those who would have the colleges and universities become "relevant" is the problem of the colleges or universities becoming politicized institutions by actively assuming an advocacy role in society, while possibly compromising their objectivity in the search for knowledge. Questions must be raised as to the appropriate degree of involvement, and as to who has the right and the responsibility to make political decisions. Should the university associate itself with special interest political groups? Should the faculty, the students, the administration, or the trustees make such decisions? How, if at all, should the organizational structure of the university be modified to reflect its choice? And how, if at all, can freedom of inquiry and expression be preserved on a campus that associates itself institutionally—or simply by common consent—with a particular viewpoint or ideology?

In those universities which try to become effective in problem-oriented instruction, research and service, the structure of those colleges and universities, now largely dominated by the traditional discipline departments, would have to be changed. An example of such a structure has been developed by Erich Jantsch.[18] In his plan, the university would become basically research-oriented, and both faculty and students would learn from their research activities. There would be a hierarchy of research operations, with the top layer concerned with problems of large societal and technical systems, drawing on scientific, technological, and humanistic thinking. The middle layer would be concerned with technological functions such as housing and urban transportation, and the lower with basic research. These organization layers would interact with each other, with the higher ones developing the comprehensive framework within which the programs of the lower ones could be guided. Throughout the institution, the larger part of the time of both faculty and students would be spent on research as compared to formal study.

At the other end of the spectrum would be institutions adhering to the traditional view of the university seeking knowledge for its own sake.

Again in the words of Daniel Bell, we could create "an autonomous system of elite universities and liberal arts colleges whose justifications would reside in their allegiance to the classic pursuits of truth and scholarship and also would be recipients of the traditional immunities of a university so conceived." [19] Professional and technical training would be provided by a large-scale system of State universities and junior colleges. Social and technological problems would be dealt with by a large-scale client-oriented research and service system.

The choices made by individual universities under Bell's plan would be expected to reflect their particular abilities. To the degree problem-solving programs would not be included in any one college or university, other colleges and universities or independent research and service organizations would have to provide the missing functions.

In sum, these are two of the models available. Clearly what is called for is not one model, but a mix on the continuum between extreme "relevance" and whatever we may label the opposite. The problem is that we do not know what an appropriate mix is, or what policies and actions would be required to obtain that mix.

The two ideas just discussed have concerned the problem of institutional organization. These are important questions, but if taken in isolation from the content of curricula, will not provide society with the skills it needs in managing change.

### Education and the Provision of Skills

Is there a basic set of knowledge and skills which will carry an individual and his society through a period of change? Are the standards that are presently maintained more important than new ones that might be developed? And, what should the schools try to do? They no longer are able to play an exclusive role in maintaining standards. Also, skills are obsolescing rapidly, and much has been said about the need for lifelong learning to allow an individual to acquire new skills as needed.[20]

Whether curricula are problem-oriented or discipline-oriented, there is a question as to how much emphasis should be placed on inculcating knowledge and how much on developing a capability for self-learning and self-evaluation. Herbert Simon has argued:

> At every convocation we describe to our graduating students the world of incessant and accelerating change that they are entering, a world in which their knowledge will soon be obsolete unless learning continues. If we believe what we say in such addresses then helping the student to learn subject matter or specific skills is unimportant; helping him to acquire the skill of independent learning is all-important. If we act on our beliefs and give more than lip service

> to the goal of lifelong learning, then learning to learn, instead of learning subject matter, will become the central objective of almost every college course.[21]

The charge of irrelevancy has been directed not only towards the social problem-solving role of the institutions, but also towards the significance of school curricula in helping an individual to understand himself and his role in society, and to select his life's work.

Some claim that a major source of frustration for youth in seeking education and self-identity is that the schools do not provide experience in the "real world." Throughout man's history, such experience has been a major factor in both the cognitive and the social development of youth. Only in the last century has our society isolated young people from such experience by increasing the number of years they spend in school and thereby extending the period of their dependence.[22]

Some feel that this situation is exacerbated within the schools themselves because the individual's role is a passive one; education as practiced looks to them like a process of transferring information to a student whose responsibility is to absorb it and play it back upon request.[23] Not only does the school seem to have little connection to the student's real environment, but the system also, by virtue of its past assignment to undertake the entire function of education, seems to isolate him systematically from the environment. Thomas Green has said:

> To be successful, the educational process requires an educational space, a sphere of action, a "wrestling ring," in which the struggle that is involved in the process of self-discovery and self-disclosure can take place.[24]

And yet many thoughtful observers believe that the essential function of educational institutions is to inculcate the analytical, social, and cognitive skills that are prerequisites for continuing learning, and that this can best be done in a rather formal setting that is removed from the life of the "real world." The acquisition of these skills may be incompatible with a "relevant curriculum," and difficult choices must therefore be made.

### Education and Minorities

Another major concern in our society is the apparent lack of equal educational opportunity for minority groups. In the last 16 years, the Nation has made a major commitment to try to end this inequality, by removing legal barriers and by providing a wide range of auxiliary or compensatory education programs. Considerable progress has been made along the first dimension, and this Administration has committed itself to wiping out the remnants of de jure segregation.[25] A remaining issue,

that of de facto segregation, now confronts many school districts throughout the Nation. Because it is entwined with complex patterns of housing, population distribution, and transportation, as well as with questions of educational policy, there will probably be no simple or speedy resolution of this issue.

Progress has been considerably less satisfactory in the area of compensatory education, and the ambitious programs of the past decade are thought by many to have been less than fully successful. One explanation is that "equality of educational opportunity" has normally been equated with equality of access to educational institutions of comparable quality—with the quality of the schools being measured in conventional terms of physical plant, teacher-student ratio and the like. Logically enough, many compensatory programs were constructed to try to equalize these measures of educational input, and it was taken for granted that they would serve to increase student achievement and other measures of educational output.

Some minority leaders in urban areas have concluded that the only hope for success in improving schooling for their young people at the elementary and secondary level lies in community control. It is argued that parents and community leaders are more aware of the educational needs of the children than professional educators at a central office. For those frustrated in dealing with the central school board of a large city, another alternative is decentralization in which partial control rests with the local community. Results to date of experimental efforts are strongly debated, and much remains to be learned about the potential of either decentraliz .tion or community control.

At the college and university level a number of ideas have been proposed to assist disadvantaged youths in obtaining a degree. For those with inadequate preparation, the proposal has been made that junior colleges take responsibility for raising the student's skills. Other programs would be open admissions and quotas. Under open admissions, all high school graduates are accepted into the college or university and those without adequate preparation are provided with the necessary remedial courses. In the second procedure, a certain percentage of admissions would be allocated for minority students who, if necessary, would be recruited to fill all the openings. Again, remedial courses would be provided by the host institution.

The main criticism of the open admission and quota policies is that college and university standards would be lowered. The quota system, in addition, is accused of reverse racism in which qualified white students are unjustly denied admission for less qualified minority students. Persons who voice these objections suggest an intermediate or remedial role for

junior colleges, a role that will enable disadvantaged youth to come into the mainstream of higher education without open admissions or quotas.

The proposal to have junior colleges assume remedial responsibilities raises two issues. First, there is some question as to whether or not programs can be established to meet the need. Second, there might be a problem with the reputation of the junior college being tied to the remedial role, and the junior college might be shifted away from the important role played in providing postsecondary education to those not desiring or requiring a full 4-year college program.

Whichever proposal gains acceptance, there is a great deal of concern that more emphasis be placed on improving secondary education for minorities. Also, either proposal will require additional money to support the corresponding programs of courses.

Consideration of educational output has important implications not only for the minority groups of our Nation, but also for all those who are disadvantaged by their social, economic, geographic, or ethnic situation. Although the best-known sufferers from this phenomenon are low income, minority group members who reside in big cities, it is also acute for rural and urban whites and for other groups in the United States.

At the same time that compensatory programs were being launched, new research began to suggest that in fact the familiar inputs of schooling had relatively little effect on pupil achievement, at least by comparison with the powerful effect of the life circumstances of the youngsters. Disadvantaged boys and girls, born and raised in family and peer group surroundings not conducive to high educational achievement, could not be expected to benefit very much from changes in factors that have little effect on achievement. By this analysis, compensatory programs, at least as they have been tried to date, could not realistically be expected to improve achievement—although most of their critics agree that they have helped to improve the health, nutrition, and socialization of disadvantaged boys and girls. Moreover, the discovery of the powerful educational effects of the first few years of life suggested that wholly different models must be tried—and far more be learned about learning itself—if equal education is to be afforded to the disadvantaged.

### Standards of Education

These rather complicated discoveries—still disputed by many and ill-understood by many more—have tended to produce a climate in which schools and other educational programs are increasingly judged by their output. While the concern for judging educational output originated from consideration of education of the disadvantaged, it has become a matter of general interest. The principal difficulty with this new approach to education is that existing tools for measuring output are

primitive. Reasonably good tests of achievement have been developed for certain basic skills such as reading and mathematics, but success in achieving other educational objectives—particularly in the affective, attitudinal, and behavioral realms—is far harder to assess.

Some respond to this situation by concluding that output measures are so elusive, distorted or inadequate as to be quite useless. Others, including President Nixon in his education reform message with its proposal for a National Institute of Education, believe that these measures must be developed, and that those who determine educational policy, whether they are local voters or national officials, must have the means of measuring the accomplishments of their schools and their students and of comparing them with others. At the same time, they believe, much improved educational research and experimentation are needed in the nature of learning itself, and into ways in which public policy can purposefully affect education.

The President has suggested that if education is to remain in the hands of the States and localities, they must have some way of evaluating it. In this connection, many observers want to preserve and intensify the diversity of educational models and experiences available in the United States. The survey entitled *Equality of Educational Opportunity*—popularly known as the Coleman Report [26]—suggests that schools in the United States are really far less diverse than most people think, and that the characteristics that distinguish them from one another tend to have little differential effect on student achievement. One way of enhancing diversity may be the "education voucher" experiment recently launched by the Office of Economic Opportunity.[27] Another possibility is to conduct more Federal programs along the "planned variation" model that is employed in the Follow Through Program and in a portion of the Head-start program. But even more daring experiments are needed if those concerned with educational policy are ever to understand the complex interrelationships between early childhood, family background, peer group influence and formal schooling itself. Werner Hirsch forwards the thesis that:

> Recent research is beginning to make it possible for us to define differences in service conditions for different populations in the country, and to begin to establish the costs to overcome them—that is, to achieve specific educational outcomes. Our knowledge has been increasing about the frequency, duration, and intensity of particular educational activities needed to produce definite types of behavior in students of different ages, aptitudes, and interests. Analysis is reaching a stage where we can begin to determine cost-effective means to accomplish specific educational objectives. To the extent this is possible, state and federal funds allocated for educa-

> tional improvements should take into account the specific service conditions associated with a given population, so more nearly equal outputs in terms of learning will be produced.[28]

Leon Lessinger has suggested that if those concerned with education shift their emphasis from "input" to "output," "a technology of instruction based on specific learning objectives will start to build." Lessinger goes on to caution that we should not go beyond "the training component"—the "basic skills of reading, arithmetic and the like"—until we are better able to specify performance objectives for other desired educational qualities.[29]

Because of the present inadequacy of standards and measures of performance outside of basic skills, many people continue to judge schools according to input measures, typically on the basis of expenditure per pupil. At present, however, it is an open question whether or not educational achievement can even be related to dollars spent in the schools. Some argue that it is necessary to use money as a criterion for lack of any better gage. For example, Coons, Clune, and Sugarman say:

> However unsatisfactory it may be as a measure for individual cases, given the present primitive state of social science on this question, money is the only feasible criterion.[30]

Others, particularly those influenced by the Coleman Report, argue against money per se as a relevant criterion. But it should be understood that they are, in effect, going well beyond the question of how to assess schools, and asking how to measure—and how to influence—student achievement. For Coleman identified as most important to educational success precisely those factors which are least understood and which the schools have least power to control, particularly the family, the peer group, and the community environment.[31]

Some have interpreted the Coleman findings to mean that factors internal to the schools have no effect. But that is not the conclusion of the report. In recent testimony, Coleman emphasized that the quality of the teachers, particularly their verbal ability, is "the element in which the schools differed most" and "the one element that showed a non-negligible relation to children's performance." [32] Hence the question must still be raised as to whether or not money, as presently used, affects the quality of teachers that can be brought to any given school.

### Financing Schools

Whatever decisions are eventually reached on defining educational standards and equality of opportunity, there will be a great deal of concern about the high costs of the schools and their operating efficiency. For those paying heavy taxes, the cost of education has been a growing source of concern. The local tax burden has reached a level at which

many voters are unwilling to support more school outlays. The results have shown up in record turndowns of school bond votes. As shown in table 1, only 56.8 percent of bond issues were approved in the 1968–69 school year, representing 43.6 percent of the dollar value. This is a considerable drop from comparable figures only 4 years previously.

The local property tax has not carried the full burden of elementary and secondary education for some time. Table 2 shows the increases in Federal and State support of local public schools since 1919.

TABLE 1.—RESULTS OF U.S. PUBLIC SCHOOL BOND ELECTIONS: 1957-58 TO 1967-68

| | Number of elections | | Percent approved based on number | Par value on issues voted on (in millions) | | Percent approved based on dollar value |
|---|---|---|---|---|---|---|
| | Total | Approved | | Total | Approved | |
| 1957–58 | (1) | (1) | (1) | $1,542 | $1,123 | 72.8 |
| 1958–59 | (1) | (1) | (1) | 1,801 | 1,443 | 79.6 |
| 1959–60 | (1) | (1) | (1) | 2,672 | 1,792 | 67.1 |
| 1960–61 | (1) | (1) | (1) | 1,605 | 1,218 | 75.9 |
| 1961–62 | 1,432 | 1,034 | 72.2 | 1,849 | 1,273 | 68.9 |
| 1962–63 | 2,048 | 1,482 | 72.4 | 2,659 | 1,851 | 69.6 |
| 1963–64 | 2,071 | 1,501 | 72.5 | 2,672 | 1,900 | 71.1 |
| 1964–65 | 2,041 | 1,525 | 74.7 | 3,129 | 2,485 | 79.4 |
| 1965–66 | 1,745 | 1,265 | 72.5 | 3,560 | 2,652 | 74.5 |
| 1966–67 | 1,625 | 1,082 | 66.6 | 3,063 | 2,119 | 69.2 |
| 1967–68 | 1,750 | 1,183 | 67.6 | 3,740 | 2,338 | 62.5 |
| 1968–69 | 1,341 | 762 | 56.8 | 3,913 | 1,707 | 43.6 |

[1] Data not available.

Note.—As printed in the New York Times, Jan. 12, 1970.

Source: U.S. Department of Health, Education, and Welfare, Office of Education, circulars on "Bond Sales for Public School Purposes."

TABLE 2.—PERCENT CONTRIBUTIONS TO PUBLIC SCHOOL FUNDING

| | Federal | State | Local |
|---|---|---|---|
| School year: | | | |
| 1919–20 | 0.3 | 16.5 | 83.2 |
| 1929–30 | .4 | 16.9 | 82.7 |
| 1939–40 | 1.8 | 30.3 | 68.0 |
| 1949–50 | 2.9 | 39.8 | 57.3 |
| 1959–60 | 4.4 | 39.1 | 56.5 |
| 1968–69 (estimated) | 7.3 | 40.7 | 52.0 |

Source: "State Aid to Local Government", Advisory Commission on Intergovernmental Relations, Rept. A-34, Washington, D.C., Apr., 1969.

The local taxpayer has some companionship in his concern about rising costs—the parents of college students. While tuition has not reflected the full increase in costs, the increases in charges are significant. Average total tuition and board-and-room charges for full-time undergraduate resident enrollment in a public university totalled $1,042 in 1958–59, $1,322 in 1968–69, and is projected as $1,601 in 1978–79. Corresponding average charges for private universities were $1,980, $2,824, and $3,661 (all in 1968–69 dollars).[33]

Viable financial support for the elementary and secondary schools based on a restructuring of public finance has been the subject of con-

siderable study. The local property tax system is inadequate to support increasing costs and promotes great disparities between districts. Variations in State expenditures in many instances actually reinforce the disparities. Proposals have been made to have the Federal Government assume up to 40 percent of the costs of the elementary and secondary schools, for the States to assume total responsibility, for regional (such as metropolitan) areas to pool resources relying on State and Federal aid to supplement their spending. The arguments for and against each proposal are numerous.[34] The administration, recognizing the need for better understanding of school financing has established a President's Commission on School Finance.[35]

The voucher system is a concept for introducing free market competition into the elementary and secondary school system. In plans of this type, a publicly accountable agency would issue parents a receipt, good for a year's enrollment at the school of the parents' choice, public or private. A major study is underway on this concept, and field trials have been proposed.[36]

Among institutions of higher education, there is a need for removal of the financial impediments to the enrollment of qualified students. In a recent message to the Congress on higher education, this administration has proposed a plan towards that end.

This plan directs aid to the students rather than the institutions, guaranteeing assistance to all financially needy, full-time undergraduate students in accredited colleges and universities. The amount and form of aid provided would depend only on the income of the student and his parents. Two tiers of support would be provided: subsidized basic aid for full-time undergraduates with low family income and unsubsidized supplementary aid for all students.[37] This plan should provide the needed relief from financial burdens for those of our youth desiring and capable of profiting from higher education, but now unable to pay for it.

The private institutions of higher education are facing extreme financial burdens. Recent reports indicate that many universities are spending considerably more than their income, and are forced to use their financial reserves. Rapidly increasing costs, inflation, and reductions in Federal spending have been more than the colleges and universities have been able to raise in contributions. Unless this changes, the private sector of higher education will not be able to expand enrollment as rapidly as the public sector. In fact, some expect a number of private institutions to convert to a State-run or in some way State-related situation.[38] The consequences of this on the calibre of the institutions are not known, but deserve critical attention.

## Policy Considerations

The issues of social and personal relevancy, of equality of opportunity, and of financing discussed here are but a sample of the educational problems to which Americans are addressing attention.

It is clear from the arguments and from study of a wider range of pertinent literature that the search for solutions will be prolonged and extremely difficult. The understanding from which it must proceed is far from adequate about all parts of the learning process, including such elementary things as the neurophysiological aspects of learning; the processes involved in an individual's reception, processing, storage and use of information; and procedures for improvement of teacher-student communications. At the level of more comprehensive problems involving management of the educational system in its interactions with other sectors of society, there are other gaps in our knowledge. For example, it is essential that decisionmakers throughout the educational system have available comprehensive models to aid them in forecasting the consequences of their particular decisions. But such comprehensive models are not available, nor has an adequate theory been developed to guide their formulation. Another and equally significant gap is in knowledge of what should be taught to students who will mature in a changed society as yet hardly outlined.

Given the realization that there are large voids in our information about the institutions and processes of education, discussion of specific adaptative procedures may be premature. Therefore, the problem for the policymaker at this juncture in our Nation's history is to strive toward development of a process for the formulation of an adaptive strategy for guiding the educational system in harmony with the transitions of the other sectors of society.

## Summary

**We have an educational system that is in many respects unparalleled. It has grown in size and resources to the point where we have nearly universal education through the secondary schools and a proportion of our population attending institutions of higher education that is unprecedented. Yet, this system is under severe attack and criticism; it is seen as having been set up to serve the needs of an America that has greatly changed in the intervening years. There are many who argue that it is necessary for the schools to deemphasize quantitative expansion along traditional lines and emphasize adaptation to the needs of a rapidly changing society.**

**In the past, the public has equated going to school with education. The role of the school was to transmit information and instill traditional values. The society of today is one changing so rapidly that skills**

and information become outmoded, and traditional values are under challenge. Furthermore, the proportion of information that children receive from the mass media is so large and the range of values to which they are exposed so diverse that it may well be that the schools should be devoted to giving them the cognitive skills for integrating information, and a framework within which to sort out the diverse values to which they are exposed.

In addition to what may fundamentally be a new orientation demanded of the schools, they are being asked to respond to current problems in two ways. First, it is said that they should be relevant to the needs of the student, which is to say that they should teach him as an individual to be able to deal with contemporary problems. Second, the higher institutions of learning, in particular, are being asked to solve the present problems of society.

The choices with which the schools are confronted involve, on the one hand, teaching problem-solving skills, fostering the development of students as individuals, and conducting problem-oriented research. Or, on the other hand, there is the option of continuing to transmit the old knowledge and values at the primary and secondary levels, and continuing to transmit the traditional knowledge and seeking to develop knowledge for its own sake at the higher levels of education.

By and large, it would seem that we must look for some appropriate mix rather than shift over to a complete doctrine of relevance. In the meantime, we need to develop further understanding of the educational process and of how to evaluate it. We must further develop an experimental posture toward innovation in education which will reflect our basic uncertainty as to how to go about the many problems with which the educational system is faced.

All of the above holds for the educational system at large. With respect to the children of minority groups, we have the special task of ensuring equal educational opportunity, and of understanding and dealing with those special disadvantages which are imposed on them by their environment.

Taken all in all, the educational system, which is the crucial single institution for the development of our citizenry so that they can live happily, shape our system wisely, and contribute to both the direction and rate of its growth, is in a state of severe stress. The educational system is having its own "growth" problems which, if not solved, will have a profound impact on the growth of the Nation as a whole.

## FOOTNOTES

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# Chapter 5. BASIC NATURAL SCIENCE

**In the discussions in this report, the need for additional knowledge about both our physical and social worlds is seen as crucial for achieving balanced growth. At the same time, an important source of our knowledge—research in basic natural science—is not only experiencing a cut in financial support, but also is being subjected to a growing questioning of its role in society, particularly its relevance to contemporary social problems.**

Following World War II, an implied goal of the United States was to be a leader in as many fields of basic research in the natural sciences as possible. This goal was given high priority and, as a result, the United States developed a large and extraordinarily successful scientific establishment. But, by the midsixties, a new debate had begun over the goals of scientific activities. The scientific enterprise had grown to the point where continuation of its rapid rate of growth would impose relatively large demands on the Nation's total resources, which were strained increasingly by demands from other areas. The resulting reassessment of the priority of scientific research was complicated by some degree of shift in national priorities away from defense and space programs, which had supported much basic research, to social and environmental problems. At the same time, questions were raised about the balance of social benefits and costs to be expected from science and technology.

Science is the means whereby we come to understand ourselves, our institutions, and the very nature of the world around us. From a practical point of view, expanding knowledge is the most fundamental resource available to us for improving our ability to solve problems of the economy, health, the environment, and the like. Viewed in this latter perspective, the funding of science is the one investment we make which has the longest and most diverse payoff for us and for all mankind. Unfortunately, because of the nature of basic science, its payoffs are the most delayed and unpredictable. This makes it difficult to relate the initial research to the ultimate payoff with clarity and certainty. It also makes it tempting to reduce funding for basic research in a tight budget situation—while benefits continue to flow from past research. Such an action, however, threatens the stability of scientific institutions, and thereby risks a loss in long-range benefits that is out of proportion to the temporary reduction in costs.

Amid the issues of values and priorities that characterize the various debates being presented under the rubric of "balanced growth," the status of basic science is a complex one. As a fundamental long-term investment in the future, it ought to have favor among those who are most future-oriented and who have the greatest stake in the future; namely, our highly educated youth. Yet it is among this group that it finds its strongest critics, mainly because they associate basic science with the military, pollution, and other issues that concern our young. However, it may well be argued that the knowledge to be gained from both the natural and the social sciences is the most fundamental tool for solving the problems with which we are all concerned. One can only conclude that one of our potentially valuable resources is in a situation in which its future must be continuously tended with the greatest of skill.

The Federal Government, the principal patron of the sciences, in the last few years has leveled off its growing support of scientific research. The reductions were imposed primarily by Congress but were also requested by the executive branch in an effort to keep the Federal budget in balance. Some research programs had to be phased out, scaled down, or even terminated before completion, and an increasing number of graduating scientists found that they could not get the research jobs for which they were trained, or which they would have preferred.

The current crisis in science is primarily one of financial support, marking a transition from a period of rapid growth to a period of adjustment to changes in the direction of growth in the face of overall budgetary stringencies. A contributing factor, however, is the previously mentioned increased questioning of the beneficence of science because of its asserted association with the military-technology establishment, with environment-polluting industries, and with biomedical technology that could be used in ways that threaten human values. Critics urge that the funds supporting science should be devoted more directly to the solution of social problems, and that scientific research be made more relevant to such problems.

### The Relevance of Basic Research

The issue of the relevance of scientific research to social needs is much more complex than is often assumed. On the one hand, there is no serious research, no matter how theoretical or basic in intention, which does not have some potential for generating knowledge which can lead ultimately to some socially valuable application. On the other hand, the most deliberately utilitarian research, whether basic or applied, can yield results which have theoretical significance. The history of science is one of reciprocity between theory and experiment, between insight and application,

and between knowledge and utility. It is misleading to conceive of a one-way relationship, or to speak of research oriented primarily to scientific knowledge in contrast to science undertaken for the sake of its potentially useful applications, as though they could be independent activities. Whatever the primary motivation of the research project the results are likely to include both, in difficult-to-estimate proportions.

Basic research, in large measure, is responsible for our success in applications, including much of our strength in defense and space, much of the improvement in health and longevity, and much of our economic growth and productivity. Science has been supported in the United States primarily because of its expected direct benefits. Yet, to stress its payoffs is to encourage the feeling that if it is not immediately useful it is not worthy of support. The major issues are to what extent it is desirable to choose basic research projects or fields or provide training programs on the basis of their estimated relevance to potential usefulness and to what extent scientific criteria alone are a better guide to the allocation of funds for scientific efforts.

The difficult specific questions include:

How much financial support should be given to basic research, compared with other needs of the society?

Within basic research, how should scientific effort be divided between primarily "knowledge-selected" research and "utility-selected" research, granted that all basic research is intended to gain new knowledge and has some unknown potential for ultimately useful or harmful application? Most basic scientists would temper the demand for relevance. They advocate the preservation of a core of basic research which is selected for its contribution to scientific knowledge for its own sake, rather than on the basis of potential social benefits. This core should be adequately funded, of course; but still more important, say the scientists, it should be guided in its work by the judgment of the scientific community itself on what knowledge is valuable for scientific rather than other social purposes. Because of the adequacy of funds relative to the size of the scientific enterprise, scientists had this freedom to a great extent in the recent past. In effect, whatever was judged worth doing in scientific terms was done. It is only now, when funds have declined in relation to the capacity of the scientific establishment to put them to use, that harsh choices must be made and questions of priorities within science become serious.

But to deal with these choices on the assumption that basic research may be usefully channeled into "relevant" fields may be to ignore that it is to a large extent unpredictable which areas will produce concrete benefits, and over what time span. Science develops largely according to its own internal system of governance and provides a base of knowledge that is to be valued not only as a contribution to solving our present problems,

but as a resource which may be brought to bear on problems that will emerge in the future. The amount of "knowledge" or "utility" that ultimately results from any basic research program has much more to do with the quality of the work, and a long and uncertain chain of developments and applications, than it has to do with the researcher's intended result as he begins his work.

As has been pointed out, the relevance of basic research to the development of defense and space technology and to the increase of economic productivity have both been well established, and in turn have been the source of much of the present criticism of both technology and science. The present urgings for relevance in basic science would have it turn to areas of social and environmental concern. Human, animal, and plant biology can contribute fundamental knowledge pertinent to our environmental problems, as can geophysics and oceanography. Basic knowledge that might give us new synthetic fertilizers, detergents, and other materials could also contribute to the solving of pollution problems. Additional knowledge of neurophysiology might contribute to understanding the learning process and to improving education. Better knowledge of the physics of the solar system is relevant to long-range weather forecasting. Any one of a number of fields of basic knowledge might produce a breakthrough in energy sources that might help to alleviate one or more of our environmental problems.

The list could be extended. In the course of doing so, one would, of course, have to point out that many of the problems for which relevant research is demanded are primarily social in nature and more properly the province of the social and behavioral sciences rather than of the natural sciences. Few social problems can be solved by a simple application of technology. On some of the most burning issues of the day, basic natural scientists find it impossible to be directly relevant in their role as scientists.

However, the point is that even though the physical and biological sciences are not relevant to all our current problems, basic research can, in fact, be relevant to many of them. It seems reasonable that basic research will find new sources of funding arising out of public concerns about environment, health, and welfare which will direct some portion of its efforts into such new areas. There are, however, some limits to what might be accomplished by directing basic research deliberately to such areas in which the relevance is obvious. Scientists are as anxious as other people to find answers that will improve the society in which they live, but they cannot dictate to nature which answers she will yield in response to their investigations. If they could, they might select solely socially relevant questions, such as, "What is the basic cause of cancer and how can it be eliminated?" But scientists cannot get nature to reply on that basis. When concepts of social utility do not, or cannot, dictate the choice

of a research project, the research is oriented to scientific knowledge for its own sake. But obviously not all knowledge is equally important. What may be called the internal "guidance system" of science generally provides subtle but effective means for deciding which scientific discoveries are important, and for guiding scientists into those fields that are most likely to pay off in terms of basic knowledge about the universe. The system, at its best, functions to insure that scientific efforts are distributed in the various fields of science so as to maximize the output of science as a whole.

The guidance system begins with individual judgments by scientists of what discoveries are most important to the advance of scientific knowledge. The judgments are expressed in articles that scientific editors select for publication in journals, and in the reception accorded to discoveries that are reported. The system tends to create a steady flow of scientists toward those fields where scientific progress is most rapid and away from those areas where it has come to a standstill. Young graduate students choosing their first fields of specializations naturally drift toward the "glamour" areas of science. Older scientists also may shift into these areas after their own fields are played out.

Generally, science seems to be most productive with regard to man's growing understanding of the universe, and the long-term benefits of science, when scientists are governed by science's own internal guidance system. This means that projects are selected on the basis of their potential payoff in terms of man's general knowledge. The knowledge that is acquired may or may not have the promise of practical applications, but the work is not chosen on that basis.

To the extent that society insists that basic scientists do work that is more relevant to present social needs, it strains the internal guidance system which science sees as best serving both its own purposes and the long-range interests of society. Scientists will be less able to work where nature appears willing to answer their questions. They may be required to work on relevant questions that perhaps cannot be answered at all at present, or can be answered only with uneconomic use of resources. Thus, excessive efforts to make science more productive in terms of immediate social goals may actually make it far less productive in the long run.

## Historical Background

At the Constitutional Convention in 1787, extensive discussions were held to explore the role that the new government would play in promoting the advancement of useful knowledge and discovery. The Constitution provides for the promotion of science and the useful arts (and a patent system). As the new Republic developed, the great enthusiasm for science and discovery among some of its leaders, such as Thomas

Jefferson, became more evident. In 1802, West Point was founded to provide the Nation's army with trained military engineers. And in 1803, President Jefferson sent Lewis and Clark on an exploration of the Northwest Territories. He also established a survey of the coastal waters of the eastern seaboard. The Congress chartered the Smithsonian Institution in 1846, and 8 years later, a National Museum, financed by public funds, was established.

During the Civil War period, one of the most important connections between the Federal Government and the universities of the country was established by the Morrill Act of 1862. This act was known as the Land Grant College Act and established the unique system of higher education which has subsequently developed in the United States. In 1863, under the pressure of the war, the Congress established the National Academy of Sciences. The last three decades of the century were marked by a series of congressional actions which developed the land-grant colleges and the interaction of the Federal Government with these institutions of higher education.

The National Advisory Committee for Aeronautics (NACA) was established by law in 1915. In that same year, the needs of the defense establishment for scientific support were met by the establishment of the Naval Consulting Board, and the National Academy of Sciences offered its services in the event of war. In 1916, the National Research Council was established. The NRC did not confine its activities to promoting research directly bearing on military problems. It established a scientific personnel roster and aided the Army and Navy in satisfying their scientific manpower needs. During these war years, research became more utility-oriented and more closely linked with industrial production.

After World War I, science expanded in private industry and in the universities but did not significantly increase its interaction with the Federal Government. During the great depression of the 1930's, the concept of science as a national resource was developed in a report published in 1938 by the National Resources Planning Board. As the country moved into World War II, the pattern of calling upon the Nation's scientists for their help, which was established in the Civil War, was repeated. In 1940, President Roosevelt approved the National Defense Research Committee (NDRC) which was later expanded to become the Office of Scientific Research and Development (OSRD). Under the auspices of OSRD, the Radiation Laboratory was established at MIT, the Jet Propulsion Laboratory at the California Institute of Technology, and subsidiary laboratories of the Manhattan project at many university campuses. When the war was over, the intimate relationship which had been established between the Federal Government and the academic scientists of the country continued with agencies such as the Office of

Naval Research. Because it was felt that basic science was useful to the Nation in its own right, the National Science Foundation was created in 1950. However, the mission-oriented agencies of defense, NASA, the AEC, and so forth continued to support much basic research in the universities.

The increasingly generous Federal funding during the 1950's and early 1960's assured that basic natural science was, by and large, well supported.

It was only natural that, in the cold war climate of the 1950's, national priorities continued to emphasize exploitation of scientific knowledge because it was in an intuitive way related to the defense posture. The launching of Sputnik in October 1957 changed the pace.

At that time few scientists raised a voice of apprehension about support by mission-oriented agencies, and virtually no public doubt was voiced concerning the legitimacy of this priority. The other areas of emphasis were the health services, where, as a consequence of prosperity and the development of biological and life sciences, health began to be considered a fundamental human right, and, hence, relevant research and service came to be viewed as an important responsibility of government.

But the swelling public support for science based on its utility made the scientific enterprise potentially more vulnerable to shifts in social values and national priorities. The increasing tendency to mobilize scientific effort to cope with national problems posed the possibility of a challenge to the internal balance of the scientific enterprise, and this to some extent endangered both its continuity and long-term stability.

This problem for science remained latent so long as the level of funds supporting basic research benefited from the charisma of applied and mission-oriented science and technology. As long as funds were ample, scientists could, by and large, continue to work on the problems they felt needed study.

By the midsixties, however, budgetary strains combined with a reduced demand for new military and space technology began to produce first a drop in the rate of increase in funding, and then a leveling off. After almost doubling between 1960 and 1965, Federal research and development obligations stayed between $15.3 and $16.5 billion from 1966 through 1970. With the real costs of programs rising and with decreasing dollar purchasing power, research and development support levels actually fell in real terms. The Report of the President's Task Force on Science Policy estimates this rate to be approximately 5 percent per year. Dr. Lee DuBridge, President Nixon's Science Adviser, estimated in April 1970 that in "real" (i.e., constant) dollars U.S. research support had dropped 30 percent in the past 4 years. At the same time, the continued expansion of research manpower and aspirations put an increas-

ing burden on the decreasing purchasing power of the funds available. This shift was viewed everywhere with alarm. Some thought it appropriate that a change in priorities be accompanied by a reallocation of resources. The total number of full-time equivalent scientists and engineers employed in the United States was 237,000 in 1954. The figure climbed steadily to 354,000 in 1958; 425,500 in 1961; 498,500 in 1965; and 564,600 in 1968, and has continued to grow.

Where once there had been ample funds relative to capacity, there now is an excess of capacity in relation to available funds.

As early as the midsixties, the achievement of the national goal of the pre-eminence of the United States in all scientific disciplines was becoming less certain. Scientists began to warn that in various fields where we had been pre-eminent, the United States was no longer the leader. By 1970 some scientists were expressing gloom about the future of science in the United States.

As the Nation turns toward the solution of its societal problems, the universities and the scientific community are being subjected to a deep-going reassessment of their role and relationship with the Federal Government.

**Problems in Government's System for Supporting Science**

One particular event had special significance for science in the past year. This is the so-called Mansfield amendment to the Defense budget,[1] specifying that research funded by the Pentagon be limited to research that has a "direct and apparent relationship to a specific military function or operation." Although the intention of the amendment was not to penalize basic research, but to curtail the military role to directly relevant concerns, the immediate impact was a reduction in funding for academic research.

Regardless of its intent, the Mansfield Amendment caused a widespread fear within the scientific community that the "spirit of the Mansfield Amendment" will spread to other areas, and will eventually undercut Government support for advancement of knowledge that cannot be shown to bear directly on a given Government mission. The National Science Board has warned that such an attitude could be "destructive of a great national resource, unless compensatory actions are planned immediately."

The National Science Foundation, whose appropriation for fiscal year 1970 is no greater than fiscal year 1965, cannot fund all the investigators and programs whose support was terminated by the mission agencies. The President's Science Adviser, Lee DuBridge, has commented, in a statement before the House Appropriations Subcommittee (March 23, 1970), that "attempts to strengthen the role of the

National Science Foundation in assuming a greater fraction of the Federal support have met with very limited success." Scientists thus are concerned that while Government agencies find it more and more difficult to justify allocations to basic science whose contributions to their missions is either unpredictable or invisible in the short-run, the National Science Foundation lacks the funds to safeguard conditions for continuing high quality in U.S. basic science.

## Emergence of New Attitudes

As noted above, the decreasing rate of growth in Federal support of basic natural science has occurred during a growing debate about the relationships between science and society. There has been a decreasing willingness, especially in the universities, to accept science as a source of enlightenment and power. Opposition to the Vietnam war has led to criticism for contributing to military technology. In addition, the increasing visibility of the environmental crisis has raised widespread doubts concerning science's links to the business community. Public perception of science as the engine of technology has led many who are concerned with the impact of technology to project their attitude toward technology onto basic science itself.

The idea that knowledge is useful power—an idea which has lent public legitimacy to science especially since World War II—has become transformed to some degree, into the idea of knowledge as a dangerous power. The frightening implications of nuclear weapons live with us. The potential implications of genetic manipulation become the subject of concern. Some would curtail certain areas of investigation until their possible dangers are better understood. Others point out, however, that knowledge per se is not dangerous, but rather the application of knowledge.

One of the basic themes of this report is the growing questioning of the desirability of the concepts of "growth" and "progress" as they are often used. Certainly science and technology have contributed much to "growth" and "progress" and "change." Critics have questioned whether we can or should live with so much change. Author Alvin Toffler has used the phrase "future shock," to describe the disorientation experienced by people undergoing rapid technological and social change. Similar reactions to the supposed disruptive effects of social and technological change have led Lewis Mumford and others to propose the extreme of a "moratorium" on science so that the human race might have an opportunity to recover and reassess.

There has been some especially sharp criticism on the campuses and at professional meetings of scientists for contributing to the "wrong" missions and for developing knowledge that may be put to socially harm-

ful purposes. Science and technology also are jointly blamed for dehumanizing and depersonalizing our culture. The very norms which promote objectivity and detachment in science, and the effective control of nature through technology, are interpreted as impoverishing the human spirit and stifling the spontaneous and creative in human existence.

The reduction in public confidence in science has been reinforced by the failure of science to become a form of public knowledge, and by the increasing gap between scientists and the laity. Sociologist Robert Merton has pointed out that "popularized and frequently garbled versions of the new science stress those theories which seem to run counter to common sense. To the public mind, science and esoteric terminology become indissolubly linked."

The questioning of the ability of scientific knowledge to enlighten the public and to harness its power to the public interest, together with concern that science may be doing actual harm, has been to some extent eroding what Yaron Ezrahi calls the "social support system" of science in America. The basic question which is being raised by many scientists, policy makers and various public spokesmen is this: Can the American people find a way to foster the contribution of science toward national goals in the face of the erosion in the cultural conditions that the scientific enterprise requires?

**Rationales for Support of Basic Science**

The longrun status of basic natural science will depend not only on the establishment of appropriate institutional mechanisms in the Government, as called for by DuBridge, but also on an appropriate rationale for that support. The future of basic science in America depends on whether or not the American people can be persuaded to renew their confidence in the value of science for the culture, welfare, and security of the Nation. It also depends upon the extent to which bright young Americans can be persuaded that the pursuit of science is in accord with their values.

Broadly speaking, two contrasting though not contradictory rationales have been invoked. The first view is that science is part of culture, and therefore a necessary component of advanced civilization, and expression, like music and art, or lofty human values. This view links science with the human urge to comprehend and come to terms with the universe.

The second view sees the value of basic science primarily as an element in industrialization and economic growth, and views the goal of scientific education primarily in the acquisition of skills and the training of experts for the benefits of society. In this context, the difference between

utility-oriented and knowledge-oriented science mentioned above is viewed as a difference between short- and long-term utility.

An analysis of both the cultural and the utilitarian rationales for basic science indicates that each involves some grave difficulties. The strength of the utilitarian rationale is that it provides the most publicly persuasive justification for the support of basic science. Yet because it grounds the evaluation of science primarily in its extra-scientific utility, it narrows the discretion of scientists in choosing areas and means of research. It may entrust the fate of science to the hands of the lay public, which cannot make competent choices on the basis of internal scientific merit.

The cultural rationale for basic science is more consistent with the value system of today's students and with the preservation of the delicate internal mechanisms which steer scientific research in directions dictated by the logic of scientific inquiry, but it is incompatible with our pragmatic spirit and the concern for immediate needs. Finally, it is not very persuasive with the lay public.

Constraints on utilitarian criteria are, as has been noted, in part posed by the fact that the development of scientific knowledge is largely unpredictable, and its potential utility is, therefore, unforeseeable. To assess the value of basic research solely in terms of current needs is, therefore, often shortsighted. In fact, it could set a prior limitation upon the future options and visions of society.

The priorities of both science and society are in a state of continual change. Given this fact, there can be no fixed notions either of scientific merit, or of social utility. What is needed is a set of procedures which will enable considerations of social utility, and of scientific merit, to be fused in the process of public policy making. Consistent with the American democratic tradition, jurisdiction over the definitions of the public interest and the ordering of national priorities reside with the people or their elected representatives, not with a group of experts. On the other hand, neither the entire society nor its representatives have the required skill or the time necessary to formulate criteria of intellectual merit or define the priorities for basic research. Thus the public and the scientific community have to act jointly in fusing together science and public interest.

In April 1970, the President's Task Force on Science Policy recommended that the President direct his Science Adviser to develop, for the President's approval, a program for the development of national science policy. This program should provide for full participation by individuals, from both within the Government and from outside the Government, experienced in politics, economics, management, labor, and engineering, and practicing scientists and science administrators.

In addressing the 1969 meeting of the American Association for the Advancement of Science, one speaker [2] argued that present trends within

the scientific community and the Government indicate that new procedures for cooperation between science and Government are evolving. In his view, the scientific community is exercising increasing self-control, by restraining scientists from appealing for public support without due consideration to: (1) the intellectual merit of their proposals as judged by wider segments of the scientific community, and (2) the effect that funding of their projects may have on science as a whole. Acting through such comprehensive forums of scientific opinion as the National Academy of Sciences, the American Association for the Advancement of Science, or through numerous informal forums of science, the scientific community is expressing its tentative notions of scientific priority and merit.

These tentative judgments of the internal needs of basic science can be better integrated into the processes of public policymaking if Government and public hearings of scientific fields campaigning for public support are limited to cases where the appeals are endorsed by a large part of the scientific community. The Government already shows some signs of viewing favorably the appeals of scientific fields that have been previously approved not only by particular professional societies, but also in the more comprehensive forums of science. While such peer group judgments have not been perfect in the past, this mechanism, at least, introduces the criterion of the overall balance of science into the allocative process, thus providing means for encouraging a more balanced growth of science. In this way the public may be persuaded to support scientific excellence in fields which cannot be seen as useful for short-term missions, but which are nevertheless essential for the rationality and economy of the scientific enterprise in the long run.

On the part of the Government, there are signs of a greater tendency to go beyond immediate short-term considerations. The increasing visibility of the negative side effects of industrialization and technological development have dramatized the need for integrating long-term perspectives into public policy. Both Congress and the executive branch are moving toward the making of present policies in the context of long-term forecasts of their consequences. (This is dealt with in the chapter on Technology Assessment.) Such perspectives promote the integration of long-term considerations for the economy and rationality of the scientific enterprise into publicly defensible policy decisions for the support of basic science. But a more basic reorganization of Federal support for basic science may be called for.

As of now, no Government or other agency has the authority to appraise our national needs, determine an appropriately balanced national scientific program, and make the case for its support before the public, Congress, and the White House. Nor is there an agency with responsibility, capability, and authority to order the internal and external priorities

of science, to choose among the rich selection of options now before the Nation, or to attempt to balance the future supply of scientists with anticipated demands.

## Policy Issues and Choices

It appears that the United States must now address itself to several vital policy issues concerning basic natural science. These issues relate to the magnitude of support, the distribution of support between knowledge- and utility-selected basic research and the mechanisms for the future growth of science. Beyond these issues lies the broad philosophical issue of the role of rational inquiry in our society both today and tomorrow.

The amount of public support is one main problem. A recent report by the National Science Board offers three alternatives:

> The first would be to continue as at present with level or declining funding but attempt to maintain the present broad base of graduate departments and national laboratories. This course of action would continue to spread resources thinner and thinner. The second choice would be to accept present funding levels indefinitely and begin a planned phasing out of a number of laboratories and graduate science departments. This course of action would free funds to build up a concentration of equipment and people in fewer places, judged to be most likely to push the cutting edge of the United States scientific effort. The third choice would be to implement what appears to be a continuing national commitment to excellence in science as well as to a broad and broadening base of opportunity for participation in graduate training and science and to provide the resources necessary.[3]

The National Science Board expressed its view that the third course is "the only one which is realistically open to the nation." It argues that the first choice, of spreading resources thinner and thinner across the existing network of research and teaching institutions, would make American science mediocre and prevent it from developing any distinctive thrusts. On the whole, of the two, the NSB would prefer the second course, a planned phasing out of a number of laboratories and graduate science departments. However, it finds this latter course, though preferable to the first, inherently undesirable. Among other things, it runs counter to our values as they have been reflected in our recently successful efforts to broaden the quality of research and higher education beyond a core of elite institutions. Hence, the NSB urges a resumption of our earlier policy of the systematic support for the overall growth of basic science.

Whether or not, and to what extent, the American public adopts the policy advocated by the National Science Board will depend on the

relative value it puts on basic science in relation to other priorities in American life.

The reasons for the difficulty of developing a balance between knowledge-oriented and utility-oriented research have been spelled out above. However, if we fail to protect the core of basic science, we will endanger the strength and viability of the entire scientific enterprise. We will lose the practical results of an unpredictable nature that have been demonstrated to come from "pure" research, and we will no longer have a broad across-the-board basic capability so that we may capitalize on areas of science that may become relevant at a later date. (For example, ecology, now so obviously relevant, has been on science's back-burner for decades.)

The proportion of funding for basic science that goes to knowledge-oriented science will depend, in part, on the value that we place on the cultural value of science. and perhaps more importantly, on the value we place on long-term versus short-term investments.

Broader than any of the above questions is that of the whole role of rational inquiry in our society. The concrete policy issues which have been posed assume that basic science—one form of rational inquiry—is a valuable resource, and ask only how it may best be used. It should not be forgotten that this very premise is currently being challenged by some critics of our society. In their view, the tradition of objective, rational inquiry has produced both dangerous and depersonalizing institutions and technology. Many of the critics of science would reject rational inquiry entirely and substitute an emphasis on direct experience, emotion, and action. The need for the direction and output of science to be assessed and guided by humanistic values cannot be challenged, and in fact must be affirmed vigorously. But this objective can be attained only through the development of self-discipline and wisdom—for neither of which is there a handy formula.

## Summary

**The American scientific establishment has grown and the capacities of its researchers have developed to the point that our capability in basic research has made us preeminent in the world. Having achieved that position, basic natural science finds itself in a crisis of both financial and social support. Historically, Federal funding, the main source of basic scientific research, has been large relative to the scientific resources available to do the work. In the recent past, as the scientific establishment continued to grow, the supply of funds leveled off so that the previously relationship has in effect been reversed. There is too little money relative to the number of scientists involved. At the same time, in the past half decade, scientists and their works began to come under fire as a result of the association of scientists with the military, and with**

industrial technology which has produced environmental pollution. In concert with these two developments, our national priorities have shifted to the solution of social problems, and basic scientists are being asked to shift their focus of work from the development of knowledge for its own sake to working on basic problems which have relevance for today's social issues.

The result is serious strain on an institution which furnishes us with our most fundamental understanding of ourselves and of our world, and which has been the source from which technology has evolved in recent times to serve economic growth. In the past few decades, we have been very successful in making basic science useful, but now we find ourselves in a crisis as to how to ensure it future usefulness, and of how to balance the long-range utility of basic knowledge with present urgent needs.

One of the major decisions with which we are faced is that of the level of support we will furnish basic science in the future. This is clouded by the problem of making basic research "useful" in the short run. It is in the nature of basic research that answers to practical problems may be found in unsuspected areas of inquiry. Some problem areas, at a given time, have a greater potential for exploitation than others. Setting research priorities on the grounds of probable utility is often a choice of possible short-term benefits against the longer-term ones which might result from a more rapid expansion of the basic pool of knowledge by permitting science to pursue the internal logic of its own development.

What is needed, and may in fact be developing, is a forum in which the partially conflicting needs for maintaining the integrity of the core of basic research and the practical needs of the society are resolved.

In conjunction with the need to work out an appropriate level and distribution of funding, we must face the fact that an articulate minority are attacking the very rationale and spirit of science and of rational inquiry itself—the most elementary tools man has for the orderly guidance of his affairs.

FOOTNOTES

[1] Section 203 of the *Military Procurement Reform Act of 1970*. As of this writing, there is some possibility that this clause will not be included in the legislation for Fiscal Year 1971.

[2] Yaron Ezrahi, *Political Resources of Science*. Paper presented at 130th Annual Meeting of the American Association for the Advancement of Science, Boston, Mass. December 29, 1969.

[3] *The Physical Sciences,* Report of the National Science Board, National Science Foundation, 1970, pp. 40–41. U.S. Govt. Print. Off., Washington, D.C.

# Chapter 6. TECHNOLOGY ASSESSMENT

The rapid advance of technology has been a great source of both desirable and undesirable change in our lives. The past decade has witnessed growing concern that we should introduce technology not uncritically, but rather with careful consideration of the range of consequences its introduction will involve.

This chapter describes the evolution of a new movement which is calling for serious reconsideration of the relationship of society and technology. The implications of this change for economic growth are also discussed.

This Nation's relationship to technology may be approaching a reorientation as drastic as the apparently impending change of relationship of man to his environment. For the first time, there seems to be a serious commitment to a deliberate and cautious approach to the introduction and use of technology. Unless this basically desirable movement is carefully and appropriately implemented, there is a danger of stifling technology and hence growth, both in economic and other senses.

Society in America and the other developed nations is heavily dependent on technology—the application of scientific knowledge in practical affairs. It is not possible to return or retreat to some simpler scheme or to bygone days. The great concentrations of population in cities, advanced medical and health-care facilities, and comprehensive communication and transportation systems are a few components of a high standard of living derived in part from exploitation of science. The economic growth of the United States and our economic strength in international trade depends on continued technological change.

In the past guidelines for the application of science have been rather narrow; decisions of the marketplace to determine commercial value and the regulation of government to insure safety and to preserve equity and human rights. The great motivation for research and development was the generation of profits for the individual entrepreneur or firm which developed or adopted the technology. This has been aided by a viable patent system called for in the Constitution. From a social point of view, the use of this technology was seen as bringing immediate economic and social good to our citizens.

In recent years, increasing concern has developed over the deterioration of certain aspects of our quality of life. This deterioration has arisen

from several sources. In some instances, life has been degraded or endangered as a result of unforeseen, deleterious side effects of progressive innovations, as exemplified by the history of DDT referred to in the chapter on the "Environment." In other cases abusive practices, such as the pollution of our lakes and streams, have impaired the quality of life. In still other instances, social trends, such as rapid, often unexpected population growth and concentration of people in or near major cities, have caused environmental quality problems. A strong desire has emerged to avoid, eliminate, or minimize these undesirable effects by some process. Since technology often plays a highly visible role in many of our practices by serving as the enabling mechanism, the desired process has been dubbed technology assessment. As if an afterthought, technology assessment is also expected to increase the desirable effects (direct and indirect) of technological applications and innovations, as stated in most of the existing literature and debates on the subject. In short, what is meant by technology assessment is nothing more than a systematic planning or forecasting process that delineates options and costs, encompassing economic, environmental, and social considerations (both external and internal) and with special focus on technology-related "bad," as well as "good," effects.

**Perspective**

Recently there has been a growing realization that the pursuit of obvious and immediate benefits from increased technological applications in an uncritical fashion may be a policy not wholly beneficial to society. A time of transition in attitudes toward technology has been in effect since World War II, but only in recent years has the change become generally recognizable. As an example, contrast these two policy statements:

From the Employment Act of 1946:

> The Congress hereby declares that it is continuing policy and responsibility of the Federal Government to use all practicable means consistent with its needs and obligations and other essential considerations of national policy . . . to promote maximum employment, production, and purchasing power.

From the National Environmental Policy Act of 1969:

> The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining envi-

> ronmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

On the basis of these two contrasting policy declarations, the recently evolved position of the Congress apparently is that our society wishes to continue to expand its productive capacity, but that a more concentrated effort must be made to apply our technological prowess in harmony with social and environmental quality goals; i.e., to pursue a policy of balanced growth.

As a society we have been relatively conservative with respect to deliberate institutional change, but quite radical with respect to the introduction of new technology which in turn makes institutional change necessary. This technology has produced unanticipated and often unwanted strains on our institutions. Thus, much institutional change has occurred that might have been judged undesirable if the forcing circumstances had been assessed in advance. Even where it might be judged desirable, it almost always has been done without the deliberation which would have been possible if the need had been seen well in advance. One goal of evaluating the impact of technology is to enable us to introduce technology in such fashion that institutional change may be made with greater deliberation, and to know when to refrain from introducing technology. This is a grand goal, the full achievement of which is probably beyond our reach, but there is consensus that even partial achievement will be highly desirable.

Since World War II, technological progress has continued at a greater pace than ever. But we have repeatedly discovered that technology is not without its drawbacks, which are the focus of increasing concern.

The chapter on "Environment" provides a description of the impact of Rachel Carson's *Silent Spring* (1962) and the nuclear tests of Operation Bravo. These two events dramatized the nature of second-order consequences of technological innovations. But, like all efforts up to this time, the "assessors" were outside the policymaking apparatus and little of direct consequence occurred immediately as a direct result of their efforts.

The realization that technology may have second-order consequences, some portions of which are undesirable, is not new. What seems to be new is: (1) Technology is becoming both more voluminous and more compli-

cated. (2) The complexity of much new technology makes it more difficult to anticipate how it will do its primary job and what its second-order consequences will be. (3) As our understanding of biological, ecological, economic, and social processes improves, we are struck with the complexity of the consequences which technology can produce. (4) We have a growing determination and belief in our capacity to evaluate the second-order consequences of all our actions including the use of technology, and to include their costs in our policymaking process.

Early forerunners of technology assessment can be seen in the exaggerations of the science fiction writers. Similarly, the protests and warnings of the social critics signaled the more systematic and formalized process of evaluation that were to follow.

The U.S. Government has been informally involved in technology assessment for most of its history. For example, in 1830 a series of explosions of boilers on steamboats initiated congressional directives that the Secretary of the Treasury take corrective action. The lack of information on which to act led to contracts with the Franklin Institute of Philadelphia for experiments which produced the data necessary for safe design and proper construction of steam boilers. Eventually, regulatory legislation was enacted. But, for the most part, government efforts have been sporadic and retrospective rather than continuing and anticipatory. In short, anticipatory technology assessment has not been a part of our institutional structure.

One effort of significance was the report to President Franklin Roosevelt in June 1937 entitled "Technological Trends and National Policy—Including the Social Implications of New Inventions." The report noted that "the large number of inventions made every year shows no tendency to diminish." More pertinent to this discussion was the finding that, "Though the influence of invention may be so great as to be immeasurable, as in the case of gunpowder or the printing press, there is usually opportunity to anticipate its impact upon society *since it never comes instantaneously without signals.*" [Italics in the original.] The report's final conclusion has a current ring to it. "The important general conclusion to be drawn from these studies is the continuing growth of the already high and rapidly developing technology in the social structure of the Nation, and hence the hazard of any planning that does not take this fact into consideration."

There was a gap of almost 25 years before this statement was to begin to take the form of an active policy. Before the 1960's, the planning that took place was in the vein of more efficient development and use of technology, not for anticipating its social impact.

With the industrial revolution, agricultural engineering, and applied research in the early 1900's and the awakening of the military to science

in the two World Wars, technology's impact upon society grew more rapidly. Science promised and delivered. Society sponsored and glorified research without question.

This arrangement continued until the late 1950's when the governmental and corporate support of science and technology reached such financial proportions that a return-on-investment analysis was inevitable. Many manufacturing organizations had established research laboratories. In this period—roughly 1956 to 1966—the concept of efficiency in the application of science emerged.

The research and development (R. & D.) practitioner was asked carefully to plan and execute his science and applications in return for generous support from society. The systems approach to projects was perfected. Invention was put on schedule. Spin-off and fall-out benefits of aerospace technology were extolled by NASA. The Department of Defense procured R. & D., and sought top performance through incentive fee contracts. As other Government agencies perceived the ways in which research and development could help accomplish their missions, the problems of pollution, transportation, crime, education, housing, and so forth began to receive attention in this new dimension. The demand that science be relevant was accepted. The ability of any scientist—particularly the applied technologist—to work outside this requirement diminished.

The result of this sort of planned development of technology was to increase its overall societal impact, and thereby make even more necessary the orderly planning of its use.

## A Movement

The formal term "technology assessment" seems to have been used first by the Science, Research, and Development Subcommittee of the House Science and Astronautics Committee. In its second progress report issued on October 17, 1966, the subcommittee called for establishment of a Technology Assessment Board for "keeping tab on the potential dangers, as well as the benefits inherent in new technology and simultaneously informing the public of the nature of them." On July 3, 1967, the subcommittee chairman expanded the concept in a statement to the House of Representatives:

> Assessment is an aid to and not a substitute for, judgment. Technology Assessment provides the decision makers with a list of future courses of action backed up by systematic analysis of the consequences. . . . Our goal is a legislative capability for policy determination in applied science and technology which will be anticipatory and adaptive rather than reactionary and symptomatic.

Several streams of developments have fed what is now called the technology assessment movement. Only one of these has proceeded under this explicit label. The one which adopted the formal label of "technology assessment" was that which developed in and continues to grow within the Congress as a means for enabling that body to make social decisions involving technical matters. While the congressional activity has spread into universities and other institutions, similar activities were taking place without the use of that label.

Throughout the Government, for example, in the past decade, there has been wider concern with the second-order consequences of technology. The probable public reaction to the SST boom caused by the supersonic transport was assayed and a negative vote cast on SST flights over populated areas. Drugs came to be evaluated in terms of a wider range of effects, as did food additives. Urban planners took more consideration of the people who might be displaced. The use of DDT was finally restricted.

In parallel to the above, one might identify a "people's technology assessment" movement of a diffuse sort. Early manifestations might be increased resistance to urban renewal and highway programs: first, resistance by the people directly affected, and then increasing public support and sympathy. Also there were complaints about aircraft noise, and, more recently, a revolt against the ecological damage laid to technology. On top of these specific popular complaints there arose a more generalized, though less widespread, anti-technology sentiment which is ill-defined but sometimes vocal. This people's technology assessment is, of course, broader in its concerns than just technology. It is part of a mood of the times that is discussed throughout in this report.

It has been mentioned that one of the streams that fed into the present-day technology assessment movement was widening governmental concern with the impact of science and technology.

In early 1963, several proposals for study commissions were made in the Congress. These culminated in two units in the House of Representatives. The short-lived Select Committee on Government Research, chaired by former Representative Carl Elliott was created to investigate "the numerous research programs being conducted by the sundry departments and agencies." Their Study No. X, "National Goals and Policies," stated:

> Perhaps the most significant weakness of the Government's research and development policy formulation apparatus is its inability to consider the aggregate impact of its total program on certain critical aspects of national life. Specifically there is no way to include considerations designed to relate individual agency or pro-

gram decisions to overall national affairs in terms of their total impact on:

(1) Research resources—i.e., manpower, facilities, money for all national purposes.

(2) Non-Government technology producing and using organizations—i.e., the universities, private research institutes, industry, State and local governments.

(3) All aspects of economic policy—i.e., total economic growth, productivity, standards of living, unemployment, public investment, regional development.

(4) Other specific areas of national policy—i.e., foreign policy, social policy, fiscal policy, etc.

The report went on to challenge the lack of explicit Government objectives in each of these four areas. It highlighted our inability to forecast the net impact of research and development programs. Lastly, the report noted the absence of a sound data base for making analyses of the past or predictions about the future.

In more recent times, many agencies have begun to accept responsibility for the secondary consequences of their technological activities. The Atomic Energy Commission has actually divided itself into a regulatory (assessment) function and a civilian nuclear power development (advocate) group. The work of the Food and Drug Administration and the National Transportation Safety Board are other notable examples. The National Aeronautics and Space Administration requested the Brookings Institution to prepare the report "Proposed Studies on the Implications of Peaceful Space Activities for Human Affairs" (1961). In 1962, it commissioned the American Academy of Arts and Sciences to analyze the impact of the entire space program on society. The results have taken the form of three publications, *The Railroad and the Space Program* (1965), *Social Indicators* (1966), and *Second Order Consequences* (1969). More recently, the Office of Science and Technology has taken the lead and has let contracts for developing executive branch methods and criteria for technology assessment. In a more specific move, the Department of Transportation has contracted to study the impact of civil aviation on the public at large. Additional studies and interagency reviews are under discussion in areas such as weather modification, river basin planning, housing technology, and transportation.

Evaluating the social and other impacts of technology has not been ignored by the private sector, though the term "technology assessment" is usually not used. A summer study sponsored by the Engineering Research Foundation was held in 1969, and attended by many industry and university officials. Assessment was discussed as a new part of engineering practice. Businesses recognized that they were already doing an

increasing amount of assessment beyond the narrow marketplace considerations. For example, many activities relating to technology assessment were being upgraded—product liability precautions, standardization requirements, warranties, industrial hygiene, antipollution commitments—to name a few.

But again, the widening interaction of high productivity, rapid and wide-scale marketing and electronic advertising with a sensitive ecology and populous markets made all previous approaches to preassessment inadequate. For example, a clothes-washing compound featuring an enzyme for protein stain removal could be and was developed, manufactured, advertised, distributed, and sold—and then pumped into sewage treatment plants all over the country in a matter of weeks—with no formal consideration of the possible consequences of a new ingredient. The fears that the enzyme might alter the effectiveness of sewage treatment plant microorganisms have not been resolved since test conclusions are not in hand as of this writing. But the product is in use.

The House Subcommittee on Science, Research, and Development introduced the concept of assessment into many of its ongoing activities. Thus the problems of the adequacy of technology for pollution abatement, the evaluation of fire research and safety, the application of science to urban problems, the International Biological Program, and applied science and world economy were examined in hearings and staff reports.

More specifically, a seminar convened in September 1967 brought together the leaders of major U.S. programs dealing with "science and society" or "technology and culture." These observers, mainly scientists, affirmed the need for a formal assessment mechanism and discussed the context of social values and national goals within which assessment and decisionmaking must occur. A bill was introduced (H.R. 6698, 90th Congress) to establish a Technology Assessment Board, but it never developed into legislation.

## The Process

There has been considerable flow of literature on technology assessment and the many subjects bearing upon it. Three reports prepared in 1969 have gathered and ordered the central body of current knowledge about technology assessment.

One report by the National Academy of Sciences (NAS) concluded "that mechanisms for technology assessment beyond those currently operating are clearly needed." Existing mechanisms often were found to have structural conflicts of interest. For instance, the Federal Aviation Agency had responsibility both for regulation of aircraft noise levels and the promotion of the supersonic transport.

The NAS panel cautioned against the use of assessments in a totally negative sense; i.e., only to prevent undesirable changes. Similarly, Dean Harvey Brooks has argued that assessment based on too stringent standards of performance could "place a presumption so much against new technology that in fact incentives to innovation would create 'penalties to society.'" This NAS report provides a framework for thinking about and discussing technology assessment.

In a second report, the National Academy of Engineering (NAE) undertook three preliminary assessments in order to investigate the methodology. Subsonic aircraft noise, the technology of teaching aids, and multiphasic health screening in hospitals were the prototypes.

A difficult question arose as to how to secure expert advice when most of the expertise might be associated with interested parties rather than the affected public. While this NAE report demonstrated some aspects of the methodology of technology assessment, its major contribution was to highlight the need for more systematic and rather fundamental work to bring the art of technology assessment up to a more generally useful and reliable level.

The NAE group found that assessments would be expensive and time consuming, and therefore the setting of priorities is necessary.

> Criteria for establishing the priority of topics for assessment include the breadth and depth of the expected social impact, the visibility of the problems to legislators and to the people, and the current and expected rates of development of the technologies.

One of the problems that the NAE committee studied, that of aircraft noise, illustrates the wide range of considerations that would typically enter into a technology assessment by virtue of the fact that it considered the impact of five different strategies upon the following list of affected parties: airline passengers, airline operators, airport operators, aircraft and engine manufacturers, airport neighbors, local taxpayers, local business, local government, and the Federal Government.

In a third study, the Legislative Reference Service of the Library of Congress [1] presented summaries of a number of past issues with high technology context which had come before the Congress, ranging from the ADX–2 battery additive, to water-pollution control, to the nuclear test ban treaty. This report is useful as a source book, not only for one who would attempt assessment, but for the policymaker who will evaluate existing or future assessments. It was found that all technology questions were subsumed under a larger political assessment scope. This means that technical information is important, but that it is integrated with many other factors (as it should be) into the final decision. Often the Congress did not get technical input in time to be useful—and some-

times the information was ignored or played little part in the outcome. The primary needs of the Congress were stated to be an early warning that policymaking on technical issues was impending, and reliable information sources in anticipation of legislative action.

Since few formal complete technology assessments have actually been made to date, there is no generally accepted or simple agreement on the scope of what is meant. The most comprehensive effort to pin down the complexity and range of elements identified with technology assessment is in a House proposed bill to establish an Office of Technology Assessment for the Congress (H.R. 17046).

The bill details 15 discrete steps in the technology assessment process, each one of which involves considerable complexity. While the enumeration of such a list of steps might seem to imply that the concept of technology assessment was well in hand, in fact the length of the list only documents the magnitude of a task the parts of which are still only partially comprehended.

**Implications**

Since it is highly likely that some formal structure for technology assessment will be established, the implications for developing a national growth policy will be explored next.

Present policymaking institutions will be affected. Until quite recently, technology assessment in the sense of consideration of a full range of primary and secondary effects has been the work of scholars and critics, and has not been linked to action or to those who can take action. But now the marketplace, the Congress, and the administration will be faced with including much broader criteria for judging the merits of proposed actions. Regardless of what is done in either branch of Government, the other will want an independent assessment capability. Assessments will be undertaken in the private sector to an increasing degree as well.

Assessments undertaken in all sectors will be much broader in scope and objectives than the assessments made up to now. To be more specific, early and current "people's technology assessments" have tended to be narrowly joined on one issue, subjective in tone, and usually limited to inputs from the five senses and commonly available sources of data. Highways, airports, air and water pollution, and the siting of powerplants are some examples of this type. More formal, but still rather limited in scope, are the government's efforts on a variety of subjects including the SST, DDT, noise pollution, nuclear testing, and the more routine activities such as in the FDA. Future assessments can be expected to involve more complex events, longer time spans of consequences, and many more participants—all in more formal and sophisticated sets of activities.

A major action spurring the conduct of technology assessment was

passage of the National Environmental Policy Act of 1969 (Public Law 91–190). Under it, agencies of the executive branch can be expected to move forward even more rapidly in their assessment activities because it calls upon each agency to:

> . . . include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—
>
> (i) the environmental impact of the proposed action,
>
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
>
> (iii) alternatives to the proposed action,
>
> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
>
> (v) any irreversible and irretrievable commitments of resources which would be involved if the proposed action should be implemented.

In intent, it is a movement to ensure a more rational basis for introducing new technology and evaluating existing technology.

In practice, the technology assessment movement—whether in Government, in industry, or in people's technology assessment—has been spurred by concern over adverse effects. It is this circumstance that prompted the President's Science Adviser to warn that technology assessment should not become "technology arrestment." In principle, such analysis also might reveal previously unsuspected windfalls of technology, second-order consequences which produced benefits for little or no extra costs. The latter is the less likely possibility since it is highly probable that the proponents of the new technology will have been more diligent in exploring its advantages than its disadvantages.

Whether the net effect of technology assessment will be the arresting or the enhancement of the use of technology cannot be said at this time. However, we have already shown the willingness to arrest specific technologies, and to pay specific economic costs in doing so. The curtailment of the use of certain pesticides presumably means foregoing some immediate benefits in the agricultural sector. And, one of the larger chemical companies has sold its pesticide division, presumably because this is no longer a profitable business. The decision not to fly the supersonic transport over populated areas meant a significant reduction in the likely earnings of the aircraft and thus a sacrifice in the over-all cost/effectiveness of air transportation. There can probably be consensus that these are favorable examples of what we mean when we say that we are willing to trade off a certain amount of economic growth in favor of an improve-

ment in the quality of our life. However, it should be clear that it is important to know what price is being paid and whether it is worth it. The issue at stake is whether or not we can establish wise criteria and appropriate choice mechanisms so that we can balance the gains in quality of life appropriately against the economic costs, since these costs represent reductions in our capacity to improve the quality of life in competing respects.

Concern with the negative aspects of technology can play against other values than economic ones. This is most clearly seen with respect to drugs and food additives. In the case of prescription drugs we have judged that an additional 1- or 2-year delay in making beneficial drugs available is worth the protection gained against the side effects of these products of complex technology. However, in specific instances, the argument has been made that anxiety over side effects has not been beneficial. Probably the most conspicuous recent example is that of the birth-control pill. Excitement over its side effects has not always been balanced against the even greater dangers of death in child bearing, death or injury from abortions of unwanted pregnancies, and the benefits of effective birth control.

It would appear that the technology assessment movement—not only as represented by congressional efforts, but as expressed in the attitudes and behavior of the public at large—represents a turning point in our attitude toward technology about as profound as the change in our attitude toward the environment. While many still hold for the possibility of a "technological fix" for specific environmental, economic, and social problems, the hope for a technological solution for every ill is no longer generally shared. There is now even a severe case of antipathy toward technology that was expressed in the recent past only by a few romantics. But, it is not this extreme of feeling that predominates. What predominates is the realization that technology is generally beneficial not only in narrow economic terms, but also for solving social and environmental problems. But, it is recognized that the application of technology which has direct promise of benefits may produce indirect costs that we are unwilling to pay. And, there is a sense of diligence in trying to anticipate those costs. It is a pledge at least to consider seriously trading off economic growth for other things we value. The principle is not new. The intensity of commitment is.

Some argue that we are so rich in technology that we can afford this commitment. If we forgo the benefits of a particular piece of technology, it is said, we can find other technology, less noxious, to do the job. This position, however, can be held only to a point. It is viable only if we continue to produce new technology and are diligent in matching new technology to its full range of potential uses.

Fortunately, parallel to the technology assessment movement, there is an emerging "technology transfer" movement dedicated to finding a fuller range of uses for existing and new technology. Much still needs to be done in developing practical means for the effective delivery of research and development results to the widest range of potential users, but the concepts and methods of effecting transfer are known and tested. If these two movements balance each other, we may not have to pay a cost in economic growth for technology assessment.

Like many of the other issues associated with the search for a development policy, the task of technology assessment tests our abilities and knowledge. Only certain immediate side effects of technology are easy to anticipate.

Broadly speaking, current concerns with technology assessment focus on three areas of impact: biological, ecological, and social (including economic). In no one of these three major systems do we understand the basic system processes very well. We do our best with biological systems and our worst with social systems. To a disturbing degree, we will have to rely on speculation, and on continued monitoring of these systems to see what in fact happens. This is not an argument against trying to anticipate such systemic consequences. But it is an argument for developing our knowledge of such systems.

## Policy Considerations

Public policy with respect to technology assessment is still in an amorphous state. Regardless of whether or not the term "technology assessment" continues to be the label, it is clear that in both the public and private sector assessments of the impacts of technological advances will increase. Both pre- and post-assessments will be conducted to answer the questions, "What if . . . ?" and "What happened . . . ?" The option of judging the impact of technology on the historically narrow range of technical criteria seems rejected.

In an address to the National Academy of Sciences, President Kennedy said, "everytime you scientists make a major invention, we politicians have to invent a new institution to cope with it." He mentioned specifically:

> . . . our responsibility to control the effects of our own scientific experimentation. For as science investigates the natural environment, it also modifies it—and that modification may have incalculable consequences, for evil as well as good . . . . The Government has the clear responsibility to weigh the importance of large scale experiments to advance knowledge for national security against the possibility of adverse and destructive effects

> . . . . As we begin to master the destructive potentialities of modern science, we move toward a new era in which science can fulfill its creative promise and help bring into existence the happiest society the world has ever known.

The innovator or anyone who would introduce a new technological product or process will conduct his own assessments informally (product and market testing) to decide the timing, extent, and procedures for introducing the new item. He will want to know the degree to which his product meets the social needs or desires that have been identified, and he will want to be aware of any negative economic, environmental, or social consequences. But he will be concerned primarily with the consequences which affect him, or for which others can hold him accountable if it affects them.

As the product, process, plant, highway, airport, or other "thing" comes into being, we have come to expect another informal type of technology assessment previously referred to as people's assessment. Individuals or groups react through their senses and with whatever information is available. They apply their own value systems and generate their own expectations as to possible and probable positive and negative consequences. They buy or reject products. They welcome or reject a powerplant, or throughway, or an airport. Their reactions range from apathy, through protest and action, to rage—individual and organized. (See the chapter on "Consumerism" for a more complete discussion of this.)

The assessments of the originator are, understandably, made from his point of view, and for his benefit. Sometimes he makes the results available to the government and to the public. Often he does not. However valid his own evaluations may be in fact, they are always suspect. Thus, there is an argument for more formal assessments by outside parties. Public responsibilities where safety and health are concerned are met through formal institutions for assessment as, for example, the Federal Food and Drug Administration and its State and local counterparts, to name only one type. In addition, public (or "neutral") bodies should have the capability and responsibility for review of the private assessments. In the future, one can expect that the major assessment effort—in total volume, though not necessarily for major broad technologies—will be internalized in the private sector, necessitating externalizing both the evaluation and authenticating functions. More importantly, the linkage between the assessment and the ability and will to act upon the results of the assessment will need to be established.

A major set of policy options concerns the selection of those classes of technological advances for which continuing and systematic assessments, inspections, standards, controls, e.c., should be established. Next, it must

be decided who has responsibility for seeing that assessment is accomplished. To what extent should one be responsible on a do-it-yourself basis or review the findings of a delegated system? For example, the FDA does not base its conclusions primarily on its own evidence, but mainly on research findings submitted by drug firms. A complete or sample approach? What are the criteria for making the evaluation and who establishes them? The array of questions is large and complex.

Because of the extent and rapidity of technologic ' advance and the increasing awareness of consequences beyond those primarily expected, our national "assessment systems" can no longer grow in an unplanned and uncoordinated fashion. All technology cannot be pre- or post-assessed. All consequences cannot be foreseen or determined. Assessment can be costly. We can and must avail ourselves of the benefits from assessment—avoidance of major adverse effects, minimization of surprise, and criteria for the direction of research and new applications of technology.

On the other hand, all risks, damage and unpleasantness cannot be avoided. We must, also, not let the existence of technological assessments lull us into a feeling of false security. Nor can we completely delay or forgo the known economic, social, and aesthetic benefits of technological advances in fear of vaguely anticipated imperfections. Methods, institutions, criteria, and ways of tying into the decision processes the results of technology assessments are all in their embryonic stages.

Courses of action that do appear viable at this time are to: (1) continue for the immediate future to pursue our private and public affairs cautiously but without fear and pessimism—using existing market and government mechanisms; (2) simultaneously conduct pragmatic assessments with today's knowledge on subjectively selected areas or events to give answers to pressing problems and to learn by doing; and (3) initiate discussion, research, and planning efforts to deal with the known inadequacies of our present ability to assess technology and build a basis for future improvements.

## Summary

**The Nation's infatuation with technology is at a turning point as profound as that of its relationship to the environment. Historically, we have tended to do that which was technically possible, if it were economically advantageous, on the simple ground that this represented "progress." However, as technology has increased with great rapidity, it has forced on us increasing unplanned social change and environmental problems we did not anticipate and do not want. At the same time, our notions of the complexity of social and environmental problems have made us increasingly cautious with respect to the actions we**

plan to take. Our level of affluence has given us a longer time perspective within which to assess the consequences of our actions. As with so many other of the debates with which we have been concerned, the technology assessment movement—which embodies this new attitude toward technology—asks us to judge our actions by a wider range of criteria than we have used in the past.

Formally, technology assessment is a term coined in the Congress to label a set of procedures to aid the Congress in making decisions for the orderly introduction of new technology and the evaluation of technology already in use. However, it is better viewed as a manifestation of a larger phenomenon of a decreasing willingness of both the public and its representatives to tolerate the undesirable side effects of things done in the name of progress. The public has protested effectively against the displacement of people by highways, aircraft noise, and the building of new powerplants. Specific actions have indicated that we have the disposition to forego immediate economic benefits in order to avoid social and environmental costs which once would have been accepted with no more than pro forma consideration. The existence of formal technology assessment, now in both the congressional and executive branches, is to be taken as no more than a specific manifestation of the broader concern.

There are major policy problems with the prospect of doing technology assessment in a formal fashion. One is that of establishing criteria for deciding which among all of the new technologies emerging shall be selected for assessment, and how inspections, standards, and controls shall be established. Another is the extent to which technology assessment shall become a "way of life" in the American economy with increased consideration of the second-order consequences of technology through all strata of decision making, both private and public. Most general, however, is the problem of how we will manage the impact of the possibility of technology's adverse effects with the demand for new technology to ensure economic development. Among other things, we may have to accelerate our efforts to detect new benign technological opportunities and facilitate their rapid introduction to offset the impact of inhibiting the introduction and use of harmful technology.

FOOTNOTE

[1] "Technical Information for Congress," April 25, 1969.

## Chapter 7. CONSUMERISM

The concern for the effects of continued rapid introduction of technology that helped to generate the technology assessment movement has some parallel in the consumers' marketplace. The extensive array of goods now offered for consumption has provoked a debate over the consequences of *too much* choice, of diversity and proliferation of products that seem only slightly differentiated from each other, and of the quality of products available to households. This debate is embodied in the movement labeled "consumerism."

American business prides itself on its ability to create a growing stream of mass-produced new products, thanks to new technology, efficient organization, and a diligent effort to discover and to serve new needs. But the success of U.S. business—exceeding all other nations in its flow of goods and services—has bred a reaction. There is now a movement called "consumerism" which claims that the consumer's ability to make an "informed choice" is eroded and that we can no longer rely on "consumer sovereignty" to police the marketplace. Proponents of this movement complain that the vast flow of new products leaves the consumer bewildered, that the technological complexity of many products makes it impossible for him to evaluate them, and that many products have dangerous side effects. It is further alleged that the marketing skill and power of American business, long a matter of pride, leaves the consumer helpless before our large corporations.

The current consumer movement has distinctive features arising from our affluence. Previous waves of consumerism featured protection of the consumer from monopolistic control over prices, from dangerous products, and from false and misleading business practices. Such issues persist into the present and in some instances—e.g., product safety—have been accentuated. But what distinguishes the present consumer movement from those in the past is the outcry against the "flood" of new products and their technological complexity, the alleged power of large corporations to "manage" the market, the difficulties associated with buying with freely available credit, and the plight of the poor consumer left out of the mainstream of affluence. In addition, the new consumerism is much wider in scope, aiming at health services, public utilities, transportation, and automobile safety, and urging consumer representation, con-



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sumer education, and antipoverty programs. Also it may be said that the present movement is spurred by an affluent level of aspiration.

Previous waves of consumer interests raised issues of safety, deception, and so on that affect both rich and poor. The new movement has added a different flavor. Only an affluent society, where most people's basic material needs already are met, would raise the issues of reliability, quality, fullness of information, uses of credit, purity, and trust, as they are now discussed in the consumerism movement. And only a society whose material needs were assuaged could produce a generation of young people who would revolt so strongly against material success. (This is not to deny that concerns for abuses affecting the poor persist, and have even increased.)

The variety of goods in the marketplace and the high expectations of the consumer are two aspects of our affluence and the consumerism spawned by that affluence.

The variety of the American marketplace means that today's consumer is able to buy, enjoy, use and discard more types of goods and services than was ever before possible. The problem this creates for the consumer is illustrated by today's appliances. While the individual appliance may be better than ever before, and may be less likely to break down, the total number of appliances in the house has grown so rapidly in the last two decades that the aggregate repair problem probably has grown larger. Thus, for some people, things may seem worse today simply because there are more items in the marketplace.

Things may also seem worse to some consumers today because they expect more. The widely heralded advances of American technology lead the consumer to expect a great deal. He knows that American industrial prowess can produce a better article than those he buys. As prices rise, the consumer expects increased quality.

Like the other movements discussed in this report, modern-day consumerism may to a large extent be interpreted as an attempt to redirect the forces that helped produce "success" by earlier and different criteria. After all, we have succeeded in our goal of producing a vast flow of goods and services. The movement has enlisted powerful political support—a somewhat unusual circumstance since the "consumer" has none of the characteristics of the traditional American pressure groups. Consumerism is a diffuse public interest, much like the environment issue. While consumers may not be completely organized, they now have organizations and spokesmen for long-range recognition of consumer rights. Consumerism's main thrust has been to assert through legislation the right of consumers to be safe, to be informed, to choose, and to be heard. New laws give retail buyers more protection against fraudulent and decep-

tive business practices, and unsafe or unreliable products and services. Such industries as automobile manufacturing, food processing and packaging, drugs, and banking and finance have already felt the impact. Opinion surveys show that the public overwhelmingly favors laws to protect their health and safety, and that they react strongly against products they feel give little value. Consumerism can also be seen in the programs of States, counties, and municipalities as well as corporations, trade associations, and voluntary groups.

## Previous Periods of Consumer Unrest

The present era of consumerism, while it has certain unique features, follows two similar periods, the early 1900's and the 1930's. Each of the three periods occurred during a time of rapid social change. In each period journalistic exposés alerted the public concerning dangers to health and safety. And in each period, new laws came only after an aroused public overcame governmental inaction.

Economic life changed rapidly in the last four decades of the 19th century. Industrial output and employment increased fivefold. The population doubled, and the urban portion rose from 20 to 40 percent. Completion of the nationwide rail network created the possibility of national markets. Trademarked goods began to be advertised in the new mass-circulation magazines. But the new urbanism and industrialism yielded new and unfamiliar problems—urban poverty, tenement housing, immigrant ghettoes, municipal corruption, hazardous working conditions, sweat shops, child labor, and a variety of consumer problems.

By the 1870's, some of the abuses and excesses of rapid industrialization led some States and the Federal Government to enact laws to regulate them. But by then the Supreme Court had begun to interpret the Constitution to invalidate the regulation of business. *Caveat emptor* (let the buyer beware) was the law of product sales, and this interpretation was retained and extended as the courts took a strict, hands-off policy towards private contracts, no matter how unfair or oppressive the terms.

The basic posture of the law began to change in the last two decades of the 19th century. The Sherman Antitrust Act (1890) was a forerunner of a new wave of consumer-oriented laws. When the Clayton Act was added to antitrust legislation in 1914, the Government's role as protector of the public domain was confirmed. Joining the procession of early consumer legislation were the Food and Drug Act (1906), the Federal Trade Commission Act (1914), and the Federal Power Commission Act (1920).

These pieces of legislation came about because consumer advocates,

trade unions, journalists, and the executive branch clamored for them before a reluctant Congress. The first Consumers' League of middle- and upper-class advocates, formed in 1891, led to establishing the National Consumer League in 1898. The leagues joined with other groups including the National Child Labor Association, the League of Women Voters, and the labor unions, and got laws passed and enforced affecting safety and working conditions, maximum hours, child labor, and minimum wages.

Muckraking journalists exposed corruption in business and government and thereby stimulated public opinion to demand consumer legislation. The muckrakers attacked such industries as oil, meatpacking (a new national industry opened up by the new railroads and refrigerated freight cars), and patent medicines. Upton Sinclair's 1906 exposé, *The Jungle*, rescued the Food and Drug Act from burial in a House committee and brought pressure on Congress to pass the 1906 amendment to the Meat Inspection Act.

Perhaps the most important result of the first era of consumerism was recognition by American society that the consumer had a valid interest which was not always served by the existing market mechanisms.

Consumerism ebbed during World War I, but not before courts had begun to be consumer conscious. The rule of *caveat emptor* began evolving toward *caveat venditor* (let the seller beware)—a rule applied against powerful industries, such as utilities and insurance.

The depression of the 1930's ushered in the second phase of consumerism. During the 1920's educators had developed guidelines for consumer education. Consumer discontent with new and unfamiliar consumer durables found expression in *Your Money's Worth* (by Chase and Schlink) in 1927. Consumers' Research, Inc., was formed (1929) to meet the inquiries about products, which flooded in on the heels of the bestseller. By 1933, people were eager to examine critically the issues of brand proliferation, unwise spending, and misleading advertising as discussed in *100,000,000 Guinea Pigs*, by Kallet and Schlink (1933). A spate of similar books followed. The National Recovery Act (1933) gave the first formal recognition to the consumer interest in Federal law by providing labor and consumer advisory boards in the codemaking process. In 1935, consumer groups formed Consumers' Union, which fought for recognition of consumer interests throughout the years to World War II.

### Consumerism Enters a New Phase

Consumerism in America began to move into its third phase at the end of the 1950's. Again, the resurgence of consumerism was sparked by

journalistic criticisms from such authors as Rachel Carson, Vance Packard, David Caplovitz, and Maurine Neuberger, each of whom wrote one or more books on topics related to consumerism.

On March 15, 1962, President John F. Kennedy sent to the Congress a special message on protecting the consumer interest. His central thesis was that consumers "are the only important group in the economy who are not effectively organized, whose views are often not heard."

As a result of the message, a Consumer Advisory Council under the aegis of the Council of Economic Advisers was formed. In 1964, President Johnson established the President's Committee on Consumer Interests, under the chairmanship of Mrs. Esther Peterson, Assistant Secretary of Labor, and later Executive Secretary of the Consumer Advisory Council. She was subsequently named Special Assistant to the President for Consumer Affairs. Mrs. Peterson was succeeded by Miss Betty Furness.

As public interest grew in consumerism issues, Congress passed the Fair Labeling and Packaging Act (truth in packaging) in 1966 and the Credit Disclosure Act (truth in lending) in 1968. Congress also approved legislation on poultry and meat inspection, pipeline safety, fraudulent land sales, and hazardous appliances regulation.

Mrs. Virginia Knauer, current Special Assistant to the President for Consumer Affairs, can now deal directly with the heads of corporations and businesses to help consumers with their problems. She is working with the States to improve consumer protection laws and is advocating a Consumer Register—a translation of the Federal Register into language easily understood by the layman so that consumers can comment knowledgeably on proposed Federal regulations.

In addition, a consumer education office has been instituted and is now planning a set of guidelines for all grades in the public schools beginning with kindergarten, and has been authorized to deal directly with consumer complaints.

One of the major research projects her office deals with is the problem of disclosing for public use the expertise gained by Government testing and purchasing agencies in order to give to the consumer a better set of standards in his buying decisions.

In his Consumer Message of October 30, 1969, President Nixon offered a "Buyer's Bill of Rights:"

> I believe that the buyer in America today has the right to make an intelligent choice among products and services. The buyer has the right to accurate information on which to make his free choice.
>
> The buyer has the right to expect that his health and safety is taken into account by those who seek his patronage.

The buyer has the right to register his dissatisfaction, and have his complaint heard and weighed, when his interests are badly served.

## Complaints of Consumers

Many issues of past waves of consumerism have persisted into the present. Consumers still complain of deceptive practices, product failure, product dangers, lack of competitive pricing, and the plight of poor people in the marketplace. Added to these accusations are complaints about package shapes and sizes that confuse or deceive the buyer. The old issue of product unreliability is compounded by the difficulty of getting adequate repairs for complex appliances.

Consumer movements always have been concerned with the marketplace problems of the poor. Not only do the poor lack money, but they frequently lack information and understanding, and must buy and borrow money under disadvantageous circumstances. The present consumer movement has been especially concerned with minorities in the ghetto. In addition to the traditional marketing problems of the poor, ghetto residents have suffered from discrimination in access to housing, and until recently in access to some services.

However, there are certain new features of consumerism that stem from the development of the economy. In recent years the emphasis of American business has shifted from production to marketing, with the latter occupying an increasing role in the total job of producing and delivering goods and services. The change reflects the fact that ability to produce products was mastered earlier than was the ability to detect new needs and then to design, distribute, and promote new products. But many people see production as an honest activity while marketing is a nonproductive activity—virtually by definition. This is not the place to analyze this assumption, but rather to record its persistance into an era in which marketing has assumed enormous importance. This negative evaluation of marketing represents an essential ideological difference between much of today's consumerism movement and current business practices.

Crucial for our understanding of modern marketing is the fact that the means for satisfying man's basic needs for food, shelter, transportation, warmth, and clothing were developed long ago. We now are concerned with improving the distribution of these necessities, and then with better ways of satisfying these basic needs, and with comfort, convenience, esthetics, and social and psychological needs.

To the modern businessman the detection and serving of new and subtle needs is a legitimate and challenging activity. The businessman sees himself as improving the quality of American life, but to his critics,

many of these activities are suspect. To the critic, these subtle needs are nonexistent until the marketer creates them. A characteristic reaction is that of Dorothy Sayers:

> A society in which consumption has to be artificially stimulated in order to keep production going is a society founded on trash and waste, and such a society is a house built upon sand.

The two contrasting notions of what a market is, or should be, place different meanings on the concept of a product. For the critic of modern marketing, a product is—or should be—a commodity that is one of a class of relatively undifferentiated items which serve some primary need. An automobile, for instance, serves man's need for transportation. But the modern marketer sees a product as something much more complex; in the marketer's view, the product serves as many purposes as he or the consumer can imagine. The automobile, for instance, is seen not merely as a means of transportation but as a symbol of status and potency, a token of self-indulgence, and even as a means of making oneself attractive to the opposite sex. If a product attribute, such as its appearance, is communicated by advertising, the product is said to gain as much utility as it might if it were actually redesigned. While the modern marketer will concede that some consumer behavior is irrational or socially undesirable, his view of what a product is makes it very difficult to establish clear criteria of rationality or desirability. The marketer must regard as legitimate any need that is not antisocial, whether the consumer already is aware of it, or if he responds to it only when it is called to his attention.

A similar dilemma involves the modern marketers' view of what constitutes "information." In the traditional view, a product is seen as basically a commodity serving a single well-defined purpose, and information is that which tells the consumer about how that purpose is served, and which warns him about the dangers that might be risked in using the product. The preferred choice process is seen as rational in the common-sense use of that term. If, however, the product is seen in the modern marketer's view as serving many needs, some of them quite subtle, the process of choice is viewed as too complex to be described by any simple notion of rationality. Thus, anything that influences a consumer's choice may be considered as information. In this latter view, the association of a product with a favorable mood (e.g. depicting a food as creating a harmonious family atmosphere, or a toiletry as attracting the opposite sex) is seen as informative, just as is technical information.

Clearly, the modern marketer's view makes it exceedingly difficult to draw clear boundaries between what is proper and what is improper—except in obvious cases of overt deception, or the invocation of socially undesirable appeals. The marketer argues for "consumer sovereignty,"

declaring that the consumer is, by and large, an adequate defender of his own interests. But, the current consumer movement charges that the conditions of the modern market make "informed choice"—the fundamental basis of the doctrine of consumer sovereignty—extremely difficult. Consumer advocates say the consumer is helpless in the face of the marketing power of large corporations. The ordinary consumer, it is said, cannot evaluate modern products due to the extremely rapid rate with which new, slightly differentiated products are introduced and the highly technical content of modern products. At the very least, the variety and technical complexity of the new products breeds the requirement for more and different information than the consumer has had in the past.

One point of contention in the current controversy is the assertion that there is a growing imbalance between producer and consumer because of the rise of the "corporate state." The group of academicians, journalists, and consumer advocates holding this view maintains that the entire relationship between the corporation and the individual needs to be reexamined in order to remedy the vast bargaining power of big business. The economy is said to be dominated by a few hundred giant corporations which shape a future in which the whole society will have to live. These large corporations are viewed as unresponsive to the needs of the consumer. Instead, they use their marketing power—aided with massive advertising—to "manage the market," that is, to persuade the consumer to buy essentially whatever products they choose to put on the market.

This view of the marketing power of the large corporations ignores their efforts to determine consumer wants by market research, and the innumerable new products which are rejected by the market (e.g. the Edsel), or halted in the development stage by the prospect of consumer rejection even before they are brought into the market.

Extreme notions of how large corporations "manage" the market may be dismissed as exaggerations, but there is no doubt about the reality of the concern in some quarters about the power of large corporations over the consumer. There also is little doubt that many marketers of consumer goods have paid less attention to health and safety than they have to design and styling. It is not clear whether this latter circumstance should be regarded as a manifestation of callousness on the part of the business firm, or as a failure of the market mechanism in which the aggregate of individual choices in favor of styling failed to produce a socially desirable result, or both. Regardless of which interpretation one prefers, these failures have resulted in vigorous and, to a large extent successful efforts to have the government intervene and/or to make large corporations more responsive.

Linked to concern over the power of large corporations is what has been called the "impersonal" nature of the modern market. The con-

sumer shops in larger and larger stores, with increased emphasis on self-service. He buys more and more and more prepackaged goods, almost all of which have originated farther and farther from the point of purchase. Whereas previously he got much of his information from a sales person with whom he may have been well acquainted, now he gets it from advertising in the mass media or from labels developed by the manufacturer. The message is not tailored to his particular needs, but to those of broad groups of people. He must place his confidence in an unknown corporate entity rather than in an individual he has learned to trust.

All in all, the consumerism movement of today is in large part a result of the way in which the American business system has developed. There have been sufficient abuses to stir up consumer anxiety, and there are problems that warrant corrective action.

Some consumer complaints contain an element of irony. American business has long prided itself on its ability to produce a vast flow of new products. Now consumers complain about the vastness of the flow and the sophistication of the products.

The recent increase in product offerings in the U.S. market has become part of the business folklore. The number of items on the average supermarket shelf is said to have been 1,500 in 1950 and 8,000 today. The spate of new automobiles introduced into the market in recent years show a widening spectrum, ranging from standard models to compacts, subcompacts, and "personal" cars.

Traditionally, one would have thought that the introduction of many new products would strengthen the consumer's hand by increasing his range of choice. Presumably, the more items he can choose among, the more precisely he can meet his own needs, and the more precisely he can discipline the firm to serve him with what he wants. But, for some people, it seemingly has not turned out this way. One of the charges of the consumerism movement concerns the "proliferation" of new products. Aside from the difficulty of judging products of high technical complexity, the products appear on, and disappear from, the market with such rapidity that the consumer may have insufficient opportunity to become familiar with them. Consumer advocates also argue that differences among products are so trivial as to make any choice difficult.

It would be difficult indeed to document what portion of consumers are confused and to what extent by the sheer volume of new products. It would be even more difficult to balance the cost of their confusion against the benefits of the availability of new products. But, once more a precise estimate of the objective situation is not what is at stake. The fact is that enough consumers perceive themselves as being confused to make this a live issue. It has produced a demand for better product information.

The promotion and buying of so many varieties of new items has also contributed to the ideological revolt against "materialism," of which the flow of new products is a visible manifestation.

Largely ignored by spokesmen for consumer protection are the manufacturers' difficulties in recognizing unfilled consumer wants. In a market in which all primary needs are served by existing goods and services, the unfilled needs must be increasingly subtle (convenience, comfort, esthetics, prestige, ego enhancement) to the point where it is often questioned whether such needs are real or legitimate or created. Whether or not such needs are real or merely represent opportunities for the creation of needs may be debated, but the needs unquestionably are difficult to determine. The difficulty is compounded by the changing nature of the market. New products enter all the time, and consumer preferences constantly change, and at the same time there is a long lead time in developing, producing, and introducing a new product.

While a need may initially have been correctly perceived, it may have disappeared or been considerably modified by the time a product is ready for the market. The manufacturer is then confronted with the choice of either scrapping the product or trying to sell it by a vigorous and skillful marketing effort—what the theorists of the corporate state call "managing the market." In such a situation, advertising may alter the consumer's choice toward a product that does not really suit his needs. This state of affairs naturally is undesirable for the consumer, but it is equally undesirable for the manufacturer. At best, he can compensate in selling effort for what the product lacks in intrinsic appeal. More likely, his product will fail.

The difficulty of the manufacturer in detecting consumer needs is probably not in itself a matter for public policy. But it becomes a matter of public concern when it produces inefficiency in the economy.

Increased technological sophistication enables American industry to develop synthetic fabrics, processed foods, novel appliances, and other new products, but it also makes products more complex and therefore harder to evaluate. The buyer of a generation ago could do a better job of estimating the probable performance of an icebox than can today's buyer confronted with a refrigerator. The buyer of fresh fruit can judge its quality, but the buyer of a processed food can hardly anticipate the long-range consequences of the additives it contains, or even to assess the nutritional changes which may have occurred in processing.

Moreover, when a complete analysis of a purchase is too technical or time consuming, consumers tend to shortcut their decision making. For example, consumers often equate tire safety with tire life or clothes cleanliness with whiteness and brightness. In some instances, the con-

sumer may virtually abandon rational decision making, and choose almost blindly.

One consequence of the outpouring of technically complicated products is that the consumer's decision increasingly is delegated. The transfer of responsibility may be partial, as in the use of consumer rating services that judge products on several dimensions (e.g., radios on tone, sensitivity, selectivity, ease of repair, and so on) and leave the consumer to decide which attributes he values most. It should be noted that some "delegation" is done *de facto* by setting of standards. However, the setting of standards of quality may deprive a consumer of the right to buy an inferior product at a lower price. Or, the delegation may be at some stages total, as in the screening of prescription drugs by the FDA. Here it has been decided that even the average professional cannot make an informed choice. There seems little doubt that the range of products and services for which consumers will need technical assistance is likely to increase, as are those for which part or all of the decision is delegated.

At this point, the consumerism movement overlaps the field of technology assessment, covered in another chapter of this report. All the questions raised there are pertinent here. Who shall decide on what bases which product will be assessed? Where shall this function be located? How are costs to be weighed against benefits?

In short, there is reason to believe that the consumer feels he needs more protection and information as a result of changes in business practice and in the volume and nature of new products. Evidence for this need is the fact that the circulation of *Consumer Reports* has approximately doubled in the past half decade.

### Choices for Business and Government

*Business.* In recent years, leading business organizations have made careful studies of consumerism and have proposed voluntary action codes that acknowledge business responsibility to protect the health and safety of consumers, improve quality standards, simplify warranties, improve repair and servicing quality, self-police fraud and deception, improve information provided consumers, make sound value comparisons easier, and provide effective channels for consumer complaints.

Business also is responding to changes in values and tastes of consumers. Leading business firms are hard at work studying the prospects for the changing business environment, and including in their analyses surveys of changing consumer values and tastes, and the demands of the consumerism movement.

Business responsibilities (in a rapidly changing environment) are likely to expand as a result of certain long-range trends in the consumer protection movement. Higher standards of quality, integrity, and social

performance will probably be expected. Unfair and arbitrary business performance will probably be more forcefully questioned by both the public and the courts. Business will likely operate more and more under scrutiny of government, press, and other groups. Mass-production industries in particular will be affected by this trend. The credibility of the existing organizational and ethical assumptions of business will likely come under public evaluation with more forcefulness. This means that public opinion will question internal business value systems as they affect individuals, possibly changing the philosophy and practice of management in many ways.

The relationship of mass media to the consumer, for example, is likely to undergo increasing scrutiny. Increasingly, the public questions the value assumptions of advertising messages, as well as the news and public affairs content of TV broadcasting. Articulate portions of the public are demanding higher standards of performance, whether or not TV is "a vast wasteland." If government and business do not share responsibility for improving the educational and cultural level of programing, the demand for regulation and government intervention may become irresistible.

*Government.* Under pressure from the consumer movement, U.S. Congressmen, State legislators, and local officials are offering legislation on every phase of consumerism. The Nixon Administration has endorsed increased regulatory powers for Federal agencies, the establishment of an Office of Consumer Affairs, and bills fortifying warranties and further requirements for product testing and labeling. With truth-in-lending and truth-in-packaging laws already on the books, there now is discussion of truth-in-pricing, truth-in-warranties, and other measures dealing with producer honesty.

At the same time, government must exercise its responsibility to the consumer in a way that will preserve a favorable business environment. Much of what is being done or proposed in the consumer field is not contrary to the interests of business. If an undesirable practice is prohibited and everybody has to obey, standards of business conduct can be raised, and the competitive energy that was formerly channeled into a practice that did not serve consumer interests can be rechanneled. In the case of truth-in-lending, for example, seldom has a consumer-oriented law been so vigorously opposed. The basic argument of the credit industry initially was: "If we have to reveal everything about our credit terms we shall lose our credit customers." This has not happened. The law, and the regulations under it, have been well planned, with the ultimate cooperation of the credit industry; it appears to be fairly simple to enforce and it is effective. The result seems to have been a high degree of compliance—the disappearance of most of the questionable credit advertising

practices and development of more meaningful forms of competition in the credit industry. This instance, however, does not negate the need for vigilance in making sure that regulation does not impose restrictions that will serve neither business nor the consumer.

Clearly the business community can help shape an appropriate governmental role in consumer affairs through constructive comment. The business community itself will benefit from engaging government in open dialog within which some of the problems of an evolving society can be discussed and resolved without resorting to defiance on the one hand and the threat of legislation on the other.

The Government as a large-scale purchaser can set standards directly. The Government can and does set specifications for the products which it buys. Since Government purchases are so large, it frequently is more convenient or economical for a firm to produce all of its run of products according to government specifications rather than produce essentially two different models.

For a technology-based economy to survive and grow requires a vast system of both mandatory and voluntary standards. The Federal Government has important and unique roles with respect to these standards. In cooperation with other governments of the world, it prescribes the basic standards of time, temperature, mass, and length. From these, in turn, are derived the many standards and measurements required for the Nation's scientific, industrial, and commercial activities. Where health and safety are involved, the Government assumes a strong prescriptive, standard-setting role. By far the largest area of standard setting is on a voluntary and cooperative basis in the private sector; e.g., by business and trade associations. In this private sector standard setting the government acts at times as a catalyst, sparking the standard-setting process without having a position of its own. In other instances, the government may argue a position, while being only one of the parties to reaching an agreement.

Meanwhile, Congress and other legislative bodies face problems which have particular reference to desirable and needed standard setting for consumer goods and environmental quality. Legislative standard setting also, to some extent, shifts the focus of expectations of consumers from manufacturer to marketer to government itself. To the extent that government does move toward more widespread standard setting, all parties—producers, consumers, and the scientific and technological community—have a common interest in improving the process by which law reflects current scientific understanding and methodology. Meanwhile, a meaningful goal for informational content in consumer affairs would appear to be to keep the consuming task within the consumer's capabilities, consistent with other economic and social goals.

Finally, government is continually challenged to renew its own institutions and processes to deal with change in ways that would improve the quality of life for all consumers. Thus, the government policy that fosters outmoded or misguided activities positively wastes resources, to the detriment of the consumer, his living standards and his environment.

It seems clear that the American people and their representatives in the Federal, State, and local legislatures have rejected the choice of accepting the full scope of imperfections of the market mechanisms which have stemmed in part from long-standing business practices, and which have been greatly sharpened by circumstances surrounding our recent economic growth.

It is not clear, however, how far they can, will, or should go in the opposite direction.

Today's consumer, while scarcely impotent, seems to need help, but the virtues of the market mechanism, where it works, are well documented. The situation seems to call for a closely reasoned dialogue that will enable society to protect the consumer without interfering so much with the market process that the true growth in the public welfare is impeded.

The central features of the current consumer movement are intrinsically a function of the way the American economy, population, and society have grown over the past few decades. Despite much legislation and changes in many business practices, spokesmen for the consumer continue to assert that his problem of choosing wisely in the marketplace still lies beyond his individual capacities and will continue to do so unless more changes occur. Nevertheless, it remains true that American labor, American business and the consumer himself have jointly created an economy which produces a fabulous array of goods and services for the well-being of everyone. We must keep this in mind when we strive to correct those instances in which things have not gone as well as we might have hoped.

## Summary

**American business prides itself in its ability to develop, produce, and deliver a great flow of new technologically sophisticated products of a wide variety. Yet, its very success in this has produced a wave of complaints. There have been consumer movements in the past based on issues of product safety and quality, deceptive practices, monopolistic practices, aesthetics, and so on. However, what marks the new consumer movement as distinctive is that it features resentment that the stream of new products is so large and the differences among products so small that choice among them is said to have been made difficult. Furthermore, it is argued that the technical complexity of many of them is such that the untrained individual cannot evaluate them.**

The result has been the evolution of a system of consumer protection which, since 1964, has featured commissions and special assistants at the highest levels of Government, increased activity in the regulatory agencies, and, finally in 1969, a Presidential enunciation of a "Buyer's Bill of Rights." Laws have been passed and new standards set. Testing procedures have been tightened. Consumer information services have grown.

The anomaly of the present consumerism market is that a highly market-oriented economy has produced a situation, in which it is said by at least an influential minority, that the doctrine of consumer sovereignty—the notion that the consumer can regulate business by his free choices—is no longer tenable for some undefinable but sizable segment of the marketplace. Some extreme manifestations of this position would have a considerable impact on the way our economy runs. Already, the consumerism movement has had an important and probably beneficial influence on business practice. This movement consists of a myriad of small issues, but the large one confronting us is that of developing a proper policy posture that will give the desirable amount and kind of protection to the consumer and, at the same time, preserve a business environment in which the economy can continue to grow.

The consumerism movement has been regarded by some as a fad. It is important to note that the complaints which stimulate the present consumer concerns are an integral part of a technologically sophisticated, market-oriented economy such as we have so deliberately developed in recent decades and which seems certain to continue.

## Chapter 8. ECONOMIC CHOICE AND BALANCED GROWTH

The preceding chapters have examined some of the social dimensions of a policy of balanced growth. Because the notion of balanced growth also has important implications for our economy, this chapter examines the relationship between balanced growth and economic policy. In addition, the problems of poverty and improvement of housing are explored.

Many topics discussed in this report contain implications for the allocation of economic resources. For example, carrying out decisions about the distribution of population will require resources for transportation equipment and housing; the consumer movement could change product standards and the pattern of consumption; education absorbs substantial economic resources and in turn affects the productivity of the labor force; society's judgment on proposed innovations can have consequences for the rate and direction of economic growth; and programs for conserving the environment will absorb manpower and equipment.

The theme of this chapter holds that the choices that comprise balanced growth—that is, using our available output in the best way to satisfy our diverse goals—are largely separate decisions on specific problems. These separate choices, when well made, build toward a satisfactory national growth policy, and this policy becomes the sum of its components.

Conventional economic policy aims at several goals. Full employment is one that is specifically identified by law (Employment Act of 1946). Other goals, while not codified, are considered essential: an adequate rate of growth, reasonable stability of the general level of prices, and a satisfactory balance of payments. Each of these goals is related to the others, especially full employment and the rate of growth.

Stabilization policy, that is, fiscal and monetary measures, constitute the main instruments used by policymakers in achieving economic goals. Fiscal policy calls for adjustment of Government expenditures and tax rates, while monetary policy concerns the appropriate supply of money; both serve the ends of full employment, growth, price stability, and adequacy of the dollar in international finance.

At the beginning of the seventies a seemingly new aspect has been added to the list of goals. The search for "quality of life" and the appeal for reordering the national priorities embody the essence of this new aspect. These concerns mirror a desire by many Americans to create a

society better able to enjoy what it produces, and to grow in ways harmonious with the physical environment. Some Americans, of course, have always felt this way, but the extent and depth of the "new" commitment are greater than ever before.

While there are specific policies to enhance growth, the United States has never had a systematic or comprehensive policy for conventional economic growth. While growth has been and is accepted as desirable, no consensus exists on the appropriate, specific rate of expansion. Growth has come from the decisions of the many units in our economy—households, business, and governments—about saving, investment, education, research, work, and leisure. These decisions are largely spontaneous and decentralized, and the sources from which economic growth is derived —labor, capital, and technology—are so diffuse as to make a conscious national policy difficult to construct.

It would be gratifying to be able to propose a comprehensive public policy for balanced growth, a policy that would specify how to neatly resolve competing demands for housing, transportation, pollution abatement, the reduction of poverty, education, and health. The balancing of these demands along with setting the correct amount of defense and space expenditures, constitute the essence of the current debate over national priorities.[1] Decisions concerning priorities formalize choices about obtaining what is deemed desirable by the people, while relinquishing those objectives viewed as less worthy. The problem is more difficult than one of simply dedicating resources toward worthy ends: resources are limited compared to the demands made on them, so that the country is forced to be selective in its choices. Competing demands made on relatively scarce resources therefore force the country to rank its priorities.

Deciding what *should* be done is a matter for the collective choice of our citizens, who must provide the resources. It is the social preferences of the American people that rank the priorities. Purely analytic techniques, such as those provided by economics, cannot provide this ordering of priorities, but social science can help determine the costs and consequences of programs. It follows that improving the ways to express the preferences of the people will provide America with better clues for a policy of balanced growth.

## Growth with Choice

In describing the United States, President Nixon said, "Never has a nation seemed to have had more and enjoyed it less." [2] Perhaps Americans are realizing that gaining great wealth is not synonymous with contentment, that there is a difference between wealth and the good life. The

Nation's citizens may also be learning that affluence by itself does not guarantee the achievement of our goals as a nation. Because of the scarcity of resources, a large, rich, and powerful country cannot do all the things its people desire. Even the rich must choose.

In some circles it is fashionable to decry economic growth. Expansion is seen by many as the source of pollution and other wastes, and, in this view, should be curbed to secure a wholesome land. Thus, if growth of output comes at the expense of the environment, it is said that growth must be restrained. (See the chapter on environment.)

The benefits of economic growth are well known. Besides raising the standard of living and facilitating the employment of a growing labor force, economic growth provides the goods and services essential for the resolution of social problems. A growing economy, through capital investment, provides a channel for technical advances to make their way into the economy; these advances raise the productivity and earning capacity of the labor force, improve its living standards, and provide a way to reduce the incidence of poverty and raise the income of minority groups.

Rising productivity and growth have provided minority groups with a means to better their lot in the society. From 1960 to 1968, disposable income per person in these groups rose by about 75 percent.[3] This is faster than the overall rate of growth in disposable income. Further gains can be anticipated as productivity rises and employment barriers fall. However, no one proposes that the problem of equality of opportunity be relegated entirely to the benefits of a rising economy.

Economic growth has enabled Americans to have more goods and services with fewer hours on the job. Since the beginning of the century, leisure time has risen appreciably, so that our people have realized a double bounty—the ability to have more with less time at work. Leisure is an important part of the standard of living, and the great productivity of the economy has given Americans the opportunity to have more time off the job.

Growth of output and income widens the scope of individual choice—with more, we can do more. Additional services and amenities become available, the arts can be enjoyed, and more humanitarian programs undertaken.

Despite the benefits of conventional growth, there are some particular areas in which America's performance could be improved. The natural environment is, as previously discussed, being depleted. Poverty remains an anomaly amidst our wealth—a significant portion of our population shares much less than proportionately in the national income—and a significant part of the housing stock is substandard.

Taking full-employment policy as a background, two subjects will be

discussed as examples of the considerations for a policy of balanced growth: poverty and housing. These discussions are cursory and the topics diverse. Their common denominators are cost and the need for appropriate objectives and programs.

## Poverty and Balanced Growth

While an increase in per capita GNP gives an indication of the standard of living, it does not show the distribution of the benefits of economic growth. Even a large and rapidly growing GNP can mask the existence of widespread poverty. America has shown increasing concern for its poor, the "other America," and many new programs designed specifically to deal with poverty have been started in recent years.

Being poor means more than not having enough money to enjoy a minimum standard of living. Because the poor are "poor," they are caught in adversities which impede their ability to better their station in life. A "vicious circle" of poverty makes escape especially difficult: poor education or poor health result in inadequate skills, and thus little opportunity to hold dependable jobs at adequate wages. Low income virtually assures that the poor person will have little savings, and makes it less likely that the children of the poor will receive adequate education and health care. Poverty tends to be transmitted between generations, to the detriment of not only the individuals afflicted but also of the Nation which is deprived of the output and incomes that could be created if the poor were to earn a reasonable wage—not to mention the social costs.

Poor persons often pay more for the same commodities than the more affluent, or receive products of inferior quality. Credit is more costly to the poor, partly because of high risks to lenders and partly because of questionable loan practices by those who take advantage of the poor. Discrimination in housing, especially against minorities in cites, lowers the supply and quality of housing available to the poor and keeps rents high.

Public services provided the poor tend to be less satisfactory than those provided the more affluent. Schools are of lower quality, neighborhood cleanup service is usually inadequate, and police and fire protection tend to be less effective in poor neighborhoods.

Poverty is hard to define. Two ways are generally used to measure the extent of poverty: The most common is the number of families with less than some fixed amount of income, called a "poverty line," which is now defined as about $3,600 for an urban family of four. The amount considered the poverty line is calculated from the cost of a "nutritionally adequate diet," with proportional amounts added for other living costs.

Another indicator is the share of national income obtained over the

years by the 20 percent of America's households with the lowest incomes. Since World War II, the share of national income for the lowest 20 percent has remained about the same; but if the poverty line measure is used, the number of families in poverty has declined substantially.

Measurement is one thing—programs are another. The most forceful remedy for poverty has been growth in the productivity of the economy and full employment. But full employment reaches only that part of the poor population of working age who have some skills and adequate health. Therefore, higher productivity and full employment, while they contribute in an important way to breaking the vicious circle, cannot effect a complete cure of the Nation's poverty problem.

One proposal frequently cited is for the Government to become the employer of all those persons otherwise unable to obtain work. Government in its role as "employer of last resort" would guarantee positions at an adequate wage. Another proposal would be to give money to the poor in the form of guaranteed incomes. Transfer payments of about $10 billion more than current programs (such as social security and public assistance) would be needed to eliminate all poverty, under current poverty-line definitions.

The amount needed to erase poverty is significant though not staggering, and, as the economy grows with full employment, the amount declines. But since poverty is more than a simple shortage of income, it cannot be quickly eradicated by transfers to the poor. Effecting permanent cure for poverty means more education, as well as more money, and the development of habits that will allow the children of the poor population to move forever out of deprived circumstances. Thus, there is an immediate problem of raising the lowest incomes and the long-range issue of providing better education and other services to break the cycle of poverty.

The Family Assistance Plan proposed by the Administration combines transfer payments with incentives for job training and employment. This approach is directed at what should be the goal of any antipoverty plan: making poor persons self-sufficient, as well as relieving their adversity.

Alleviating poverty illustrates the nature of the trade-offs between social goals. For example, steps used to remedy the pollution problem will have consequences for the poor. If prices of some goods and services have to be increased to include costs of pollution, then the cost of living for the poor could rise. Because of their already low incomes, this increase could hurt the poor relatively more than the remainder of the population, unless the goods and services affected by price increases are not those important to the poor. These consequences must be considered in the design of antipoverty programs.

Poverty is costly to all America, and the circumstances that create it are not easy to reverse. The search for balanced growth must include a study of the ways poverty can be further reduced and the ways the process that perpetuates it can be stopped.

## Housing and Balanced Growth

Housing is the only major industry for which specific, quantified goals of production have been codified. The Housing Act of 1949 established the qualitative goal of "a decent home . . . for every American family." The Housing and Urban Development Act of 1968 reaffirmed this qualitative goal and added a quantitative target calling for building or rehabilitating 26 million housing units during 1969–78 of which 6 million would be for low- and moderate-income families.

To meet this goal, the share of GNP devoted to housing construction will have to increase from the present level of less than 3 percent to more than 4 percent by the mid-1970's.[4] With full employment of resources, such as altering of the mix of GNP will require curtailing the flow of manpower and materials from other uses, such as personal consumption, investment in plant and equipment, and/or government programs.

Housing has a direct and important effect on the quality of life. Moreover, choices of location and type of dwellings are with us for a long time, and establish patterns of individual and neighborhood life for many years.

At present, there are approximately 6 million housing units across the United States classified as substandard, 2 million of which are dilapidated. They are located both in old and decaying urban neighborhoods and in numerous rural pockets having little or no economic base. They are occupied mostly by families too poor to afford much else. Even so, rents are often relatively high. Perpetuation of these conditions through restrictions and inattention has contributed significantly to a growing divisiveness within our society, and today constitutes a major issue in the civil rights effort.

Because of its complexity, the overall housing problem cannot be solved by any single remedy. Efforts and approaches on many fronts are needed. On the "demand side" of the market, the most obvious problem is providing low income families the wherewithal to afford a decent place to live. On the supply side, ways must be found to overcome union rules restricting the quantity of labor permitted to enter construction trades and the kinds of jobs workers may perform, and also the limatitions imposed on use of materials and land by building codes and zoning laws. Cities and towns must begin to open their communities to all our people

regardless of income, race, or other distinguishing characteristics. Meanwhile, fiscal and monetary policy must be geared to generating an adequate flow of long-term financial credit at reasonable interest rates.

The housing needs of the urban and rural poor might be accommodated by increasing their incomes. More income would permit poor persons to make individual choices about dwellings and could relieve government of many of its housing programs and associated administrative complications.

Whether simply raising the income levels of the poor would take care of their housing needs depends on the answers to two questions: Would the poor spend their newly increased purchasing power on better housing, and would the construction industry respond by supplying the needed number of new housing units? The evidence bearing on the first point is inconclusive; some studies conclude that there is little sensitivity of housing expenditure to current income over certain ranges, so that more current income would not be used to improve housing, while other studies show a considerable sensitivity to expected income.

Even if large transfers of income to the poor would bring more spending on housing, the construction industry would be limited in its ability to match higher demand quickly. It takes time for production to adjust to demand, and during the interim, rents and house prices may rise sharply, especially if there were a pre-existing housing shortage.

What is needed then is a complementary approach that simultaneously increases the number of housing units available and either lowers their cost or provides families the means to afford what they do cost. The government's public housing program is one such approach. Under this program, local housing authorities actually contract to build (or have built) and then operate housing projects on which payment of Federal subsidy permits a substantial reduction in rental charges. Until recent years, however, this program was funded only at relatively low levels, and it also encountered difficulties in acquiring appropriate sites. For many years, therefore, public housing fell short of its anticipated goals. Moreover, when used in conjunction with urban renewal programs to clear blighted neighborhoods, the results were often to tear down more dwelling units than were put up, thereby causing a net reduction in the number of dwelling units available for the poor.

In recent years, the public housing program has been supplemented by a number of so-called subsidized private housing programs. Under these, the government subsidizes the interest payments due on mortgage loans generated by private lenders on what are usually newly constructed dwelling units. These programs have helped stimulate housing production for low- and moderate-income families—though not without rais-

ing questions as to whether their approach is the most efficient use of Federal resources.

In the past year, the Department of Housing and Urban Development has undertaken an important new effort known as Operation Breakthrough aimed directly at helping to overcome many of the problems lead to rapidly rising housing costs. If the general cost of housing can be held under control, the number of units on which direct subsidy payments are necessary will be reduced. Cost reductions do seem possible from the sum of a number of individual improvements in technology and efficiency, and Operation Breakthrough seems to have catalyzed an industry effort to seek out these savings.

Interest rates affect a significant part of the total cost of housing. A fully effective housing program must include efforts to lower interest rates and provide the flow of mortgage credit needed to finance units that are built and sold. This requires an adequate flow of national saving. A stringent fiscal policy, in which a surplus is maintained in the Federal budget, would help generate the necessary public saving and simultaneously help reduce interest rates. Such a policy, of course, represents a direct selection of a national priority, since it implies curtailment of spending in areas other than housing.

The potential power of a number of separate but compatible efforts to solve the housing problem is not to be underestimated. Housing subsidies, income transfers, better zoning laws, less restrictive building codes, relaxation of work rules by construction unions, the opening of those unions to more workers, interest rate reductions, mortgage guarantees, technological advance, and appropriate tax policy—all have their place—and indeed are absolutely essential in a cumulative program to meet the national housing goal.

Housing is nevertheless a clear example of the complications of debating national priorities, particularly those dealing with the quality of life. As with pollution and poverty, analysis of the housing issue cannot determine the amount of resources that should be diverted from other uses and devoted to this problem. But once goals have been specified, analysis can suggest approaches and programs suitable to predetermined ends.

**Balanced Growth Reconsidered**

Despite America's impressive growth and material achievements, we are now more conscious of the demands being made on our resources and of the scarcity of manpower and tools relative to the many social and private purposes to which these could be put. The current concern about national priorities mirrors the reality of scarcity within the world's most abundant economy, for there would be no need for debating priori-

ties in a society free from the problem of allocating limited means to competing demands.

Thus, when striving to accomplish "balanced growth" and to define a "national growth policy," our society is forced into stringent choices about those ends and purposes it seeks. "Balance" occurs when the prospective advantages relinquished equal in social worth the new goals and programs adopted.

Scarcity forces hard choices among many worthwhile objectives; but economic growth makes the achievement of more objectives possible. At issue for a national growth policy is how to accomplish growth and acquire the additional latitude it yields without incurring deterioration in our physical world, without wasting resources and opportunities, and without the sacrifice of individual identities.

There is no easy solution to these issues. Analysis can illuminate the consequences of particular programs and policies, such as the adverse results of deliberately slowing the rate of economic growth in the service of conserving the environment, or the consequences of policies to save the environment by making the market system more responsive to newly perceived values. But the selection of the ends and goals of social policy reside ultimately with the people, acting through their private institutions and through Federal, State, and local governments.

## Summary

**The search for a policy of balanced growth has major implications for the allocation of economic resources and is crucially dependent upon economic growth. Conventional economic policy goals include full employment, an acceptable rate of growth, price stability, and a satisfactory balance of payments. Added to these now is a new set of goals under the vaguely defined label of "quality of life." These concerns mirror a desire by many Americans to create a society better able to enjoy what it produces, and to grow in ways harmonious with its physical environment.**

**The setting of new goals and the establishment of priorities among them are matters of social choice. Economic analysis can help in understanding some of the central aspects of these choices, but it cannot dictate the answers. The choices themselves are those of the people, expressed individually through their private institutions and through their governments. The key choices are among competing ends. Economic analysis can contribute toward the meeting of these ends once they are chosen, and an economic policy of sustained growth can make it possible for more of these ends to be achieved.**

## FOOTNOTES

[1] For a discussion of the demands made on resources, see the *Economic Report of the President,* February 1970, ch. 3. In this chapter the Council of Economic Advisers gives a 5-year projection of the Nation's resources and demands against them. Such an analysis is essential for developing policy since it quantitatively renders the consequences of choices on available resources.

[2] *State of the Union Message,* January 22, 1970.

[3] *A Note on Black Capitalism.* Intercollegiate Case Clearing House. Harvard Business School, 1969.

[4] Second Annual Report on National Housing Goals, Message from the President of the United States, April 1, 1970, pp. 28–30.

## Chapter 9. TOWARD BALANCED GROWTH

Within and among the discussions about growth, there are a number of common or cross-cutting themes. The substance of the separate issues being debated and the elements that appear common among them make up the debate for a national growth policy. This chapter seeks to summarize the current discussion and to provide some generalizations. A national growth policy for which we are searching is neither a plan nor a program, but a continuing and collaborative national process of debate and decision.

This report is a response to the call for the development of a national growth policy as expressed by the President in his state of the Union message. Such a policy has to be developed carefully and will evolve as conditions change and as we develop more appropriate concepts and techniques. The American people need to develop better understanding of their own emerging values and goals, and to learn how to effect the needed institutional changes. Those concerned with the formulation of a growth policy need to learn not only a great many answers, but also the appropriate questions to ask. This report is one of many steps in these developments.

The preceding chapters are devoted to the continuing debates which are occurring in several topical areas over growth policy. These topics have many linkages and overlaps, and the presentation of the debates might have been organized differently. However, this report used the headings under which the debates have sprung up in recent years in order to understand the way that the broad issue of a national growth policy relates to concrete considerations in several institutional areas. No single conclusion is likely to be totally novel to many Americans. Nevertheless, the patterns they form may contribute to a sharpened awareness of the forces making for change in America, of the values and arrangements which are emerging, of the problems and possibilities of institutional reform, and the issues which must be explored and the choices which must be made.

There are a number of common themes cutting across all of the debates. As one analyzes these debates and the underlying social trends from which they emerge, one can see basic characteristics of our policy processes, processes that need to be modified during the 1970's, as well as the themes of the debates.

This chapter discusses these more general considerations and summarizes what the debates might teach us about formulating goals for a new national growth policy. Expected characteristics of a national growth policy are that it covers virtually all areas of American life and that its formulation is an open ended process. The chapter concludes with a warning that though there are limits to the role that national goals can play in an individualistic democracy there are also many areas of society where national goals are becoming both appropriate and more necessary to freedom, individualism and quality of life.

## Lessons from the Debates About the Composition of a National Growth Policy

Undoubtedly the call for a national growth policy evokes many different images of what the policy will deal primarily with, as well as what its composition might be.

The earlier chapters have described the context within which the need for such a policy emerged and some debates about areas of our national life within which aspects of the policy will be developed.

A national growth policy will not be a single policy. Rather, it will be composed of an entire constellation of policies that collectively will shape both the directions of our society in terms of its growth and the balance among many segments of the society in terms of priorities and interrelationships. To think that we have satisfied the search for this new national growth policy if we develop a strategy for limiting the size of our population or for determining in which areas of the country it will live is to think in much too narrow a context. It is clear from the preceding debates that the policies touch upon virtually every area of American life.

The idea of national growth policies is not new. There have always been policies aimed at more specific objectives, but with important implications for national growth. Encouragement of immigration to populate a new land, incentives to settle the West, and the economic policies of the last two decades are clear examples. But there is a difference about the present initiative. Previous policies have dealt in a largely independent fashion with specific objectives in their own context. We wished to get settlers onto the plains, to promote agricultural productivity, to have more education, and to have more people and businesses in each of our cities each year. All these were measures of progress. We are now moving into a new formulation of growth policies that carries us from these various modes of independent development toward a more appropriate mode of interdependent development. We are seeking to understand how things relate to one another, and how they in turn relate to furthering the quality of life for all Americans presently as well as in the future.

Therefore, pursuit of a national growth policy may be characterized as both a search for coherence among the many activities of our society, and a search for actions supportive of the human values and qualities which we would most hope to further.

It is not a policy for government alone to develop. Because it is national in scope and covers all areas of our life, the Federal Government must take the leadership initiative. But the effort can be successful only if all Americans engage themselves in the search—both in their capacity as private citizens and in their various institutional roles. The constellation of policies which will comprise the new national growth policy will not be just governmental, but will encompass every form of social institution.

We should embark on this search with the understanding that it will not be soon completed. It is both a long-term, continuing and a national process. Therefore, we can correctly say that the goal of a national growth policy is a long-term goal in these respects: it deals with the shaping of our quality of life both now and as it will be at the conclusion of the century and beyond; it will not be developed full-blown within a year or so, but rather will evolve in varying pieces through the 1970's; and it will probably never be completed, because by virtue of the dynamic nature of events, it will be open-ended.

The successful pursuit of this new national growth policy will require many modifications to our present way of approaching decisions for action and some major institutional and social reforms. In fact, as is indicated in the chapters on environment and technology assessment, some of the changes are so deep as to affect our fundamental philosophical assumptions or "world views."

## Common Themes of the Debates

It has been suggested throughout this report that the difficulties with which we are presently grappling are to a large extent the product of past "successes." These successes were genuine enough, in their own terms, but they brought with them unexpected and costly consequences. Such complexities now appear to be one of the salient features of man's lot to date—and perhaps forever. Moreover, the social consequences of each technological and economic success change even the criteria by which we judge the value of our achievement.

Judged by the challenge with which America was faced in the thirties and in subsequent decades—to develop a stable, prosperous economy—America has made impressive achievements. During those years, smoke billowing from a factory chimney was a reassuring sight. However, it now seems evident that we pursued too narrow a set of objectives for too long. The failure lay in the range of concerns to which we attended, rather than in our inability to satisfy those concerns to which we attended.

Whether or not we should have learned this lesson sooner is moot. If in fact it turns out that we have produced serious and irreversible, undesirable environmental or social effects, then, of course, we will have been too late. But this is by no means established. It seems more likely that we, as a society, learned to attend to broader and longer range consequences (of which a few critics have long been aware) at that point when we could afford to do something about such matters. We are now judging ourselves by standards that would have been inappropriate at some time in the past.

Not only is there now greater concern for the negative consequences of our actions, but we are also attempting to be more explicit about our positive objectives. The President's call for a growth policy, as has been repeatedly indicated, is explicitly linked with the observation that growth in economic terms is not to be valued for its own sake, but in terms of whether it contributes to those objectives which, taken together, constitute the quality of our lives. The specific debates are suffused with questioning not only over what has gone or may go wrong, but with what it is that we are or should be trying to accomplish.

While the breadth of participation in these debates varies, for each there is a meaningful segment of concerned public. And the campus has embraced virtually all. Some of the public involvement stems from direct personal impact—citizens bothered by airport noise or offended or affected by pollution, women who are questioning the possible side effects of the pill, and consumers who think they have been put upon. Some reaction is more symbolic. Certain critics say we have such problems because, they say, industry is "callous," government is "arbitrary," scientists "lack social responsibility," and—they add in a final flourish—"the system is corrupt."

In general, the debates reported in previous chapters have as their stated objectives that our institutions be made more responsive and more effective in their service to man. This position is being articulately stated by more and more Americans. Some writers believe this reflects a new world view, sometimes labeled as "the new humanism." Scarcely ever is any side of the debate directed against this position on a general level. There can be and is disagreement, however, as to which values shall have priority. And here, to the extent the issue is joined, the "new humanism" derogates the emphasis that we have placed on possession of goods and purchase of services.

But the issue is not entirely joined. It is not known what proportion of those who complain about air pollution would be willing to pay more for electricity or to shift their mode of transportation if actually faced with the choice. And understandably, the poor, who are short on goods and services, may regard such issues with less enthusiasm.

The debate, however, is not solely over priorities, over the allocation of resources, it is equally over means and methods. It has much to do with how our institutions and social systems work. This has to do not only with our assessment of how well we are presently doing, but with our notions as to how we might do things better.

One of the cherished assumptions of Western civilization is that, by and large, people and institutions can and should be left to run themselves and that the results of their actions will be to the general good. The consumer, in this scheme, in serving his own needs will discipline and guide the businessman. The businessman, it is assumed, will serve himself best by serving the consumer. The scientist, in turn, in exercising his curiosity will generate knowledge which will enrich mankind.

A variant on the above occurs in the case of "professionals," who offer services that only they presumably are capable of evaluating. In this instance it is assumed that they will organize themselves to work in the interest of their clients. For example, it is argued that the professionals in education should be the best judges of what should be done with education. In any event, it is taken for granted that the professions should guide their own affairs, though in the interests of their clients rather than of themselves.

A general theme cutting across the debates is the questioning of the continued tenability of these assumptions.

Of course, in reality we have always restricted the behavior of people and institutions in some ways. But it now appears that issues in an extraordinary range are being simultaneously linked and that segments of the public are more extensively involved in attempts to direct many institutions: business, education, government, and the professions. We even have the unusual cry of "people's science."

That these institutions should be responsive to the public needs and interests is beyond dispute. Equally beyond dispute is the fact that every one of these instituitions needs a certain amount of stability within which to plan and develop. Part of the task with which America is faced is not only that of agreeing on the goals and tasks for these institutions, but also that of insuring stable systems of governance and a relatively stable social environment which will enable them to do these things.

Excessive continued public involvement in the guidance of such institutions can produce undesirable instability. Excessive reliance on administrative controls will increase public costs, breed inflexibility, or prove ineffective—if experience is any guide. There are times, of course, when the benefits of administrative controls clearly outweigh the disadvantages: e.g., enforcement of standards of food quality.

To recapitulate, various of our institutions are under broad criticism, particularly with respect to the purported failure of their existing system

of governance to effect the tasks which the public expects them to do. While our institutions must be responsive to the public will, they cannot continually be guided on a regular basis by external agencies except where administrative controls are required. The guidance systems may be revised and expanded, and new policies and a new system of guidance signals established. But we will be best off when the predominant control of these institutions is returned to their own inbuilt steering mechanisms.

In many ways we have become increasingly aware of the finite nature of both our economic and physical resources. This is much of the story of many of the debates. Behind it all are the even greater resource requirements needed to solve unresolved social problems. Yet, institutions that we are trying to change and resteer are themselves resources as precious and fragile and complex as the environment of which we have become so acutely aware. And, in seeking institutional change we must learn to move in such a way as to leave them healthy, and to maintain the balance among them. This is difficult since some of the present ways for expressing the very unrest that underscores the need for institutional change make it more difficult.

Part of the story of today is the loading of additional tasks on traditional institutions. The educational system is being asked to alter the way in which it goes about its task of education, and at the same time being enjoined to contribute more directly to the solution of social problems. Business is being asked to continue to produce goods and services, avoid polluting the environment, be more responsive to the consumer's interests, and contribute to the solution of broader social problems. Technologists are being asked to produce technology that not only solves the technical problem to which it is addressed but is also benign in other ways.

It is well known that the wider the range of criteria a decision must embrace, the more difficult it is to make a suitable decision. It follows that the wider the range of criteria by which we judge the performance of our institutions, the more difficult it will be for those institutions to perform in a way that is judged satisfactory.

Consideration of the individual debates each on its own terms has perhaps given us a greater sense of the concrete issues, but possibly at the expense of the larger perspective we are trying to regain in this chapter. People of widely varying political persuasion can agree that American society is undergoing some kind of transformation, the nature of which remains controversial. And there is a complex mood ranging from concern to despair over the institutions and other resources we can bring to bear in attacking them. But despair is not conducive to the formulation of constructive policies.

Throughout the debates of this volume, and the national agenda in general, the issue of knowledge was raised repeatedly. We regularly dis-

cover that our ability to solve our problems is constrained by our incomplete understanding of them.

Knowledge, it is generally conceded, will play an increasingly crucial role in our future. If we are to live in harmony with our physical and biological world we must better understand its dynamics. If we are to steer our institutions better we must understand them better. If we are to steer them wisely we must understand ourselves better. But for the first time in centuries, one of the key premises of the age of the Enlightenment, that knowledge is per se a good thing, is being challenged. We have seen that scientific knowledge can lead to an unprecedented capacity for deliberate destruction, and a capacity for unintended harm via the byproducts of its intended benign use. Segments of the public, notably our students, are concerned. But rationality is man's supreme tool and scientific knowledge his supreme product.

The cry of the new humanists that "man is the measure" cannot be denied, nor can the potential of knowledge being turned to undesirable ends. Nor should the plea to bring our existing knowledge and resources to bear on short-term urgent problems be ignored. But none of these considerations should dampen our realization of the need for continued expansion of our knowledge of the physical, biological, and social sciences, and of the humanities. As has been indicated in several of the preceding chapters, we need the wisdom to develop institutional arrangements that will facilitate the growth of knowledge within the framework of our newly evolving humanistic values—or, perhaps more accurately, within our newly developed concern that our efforts be more explicitly directed to the serving of those human values we have held for a long time.

## Conclusion: National Goals in a Pluralistic Society

Although this report is concerned with national policy and goals, the fact that ours is a society where the people are the arbiters of what is to be done must be emphasized. For the most part we make and execute our decisions individually rather than through a national institution such as the Federal Government. Throughout this report, the discussion of national growth policy and its relations to national goals was intended to emphasize this essential characteristic of the American system. This discussion is, however, based also on a recognition that the formation of national goals has public as well as private aspects.

Even the most private and individual decisions, for example those affecting the size of one's family and the location of one's residence, are influenced by ideas the individual obtains from the outside world. There is our American culture, which affects the way each of us lives. The culture is largely inherited; i.e., a product of our history, but it is being constantly modified by the spontaneous generation of new ideas and images,

especially with the rapid and pervasive communication now possible. The discussion presented reflects the opinion that the development of the culture, and of the way individuals choose to live, will be improved if there is better informed and more self-conscious discussion of the goals of national life. It is hoped that the work of the NGRS will stimulate such discussion further.

Many individual goals can be met only if they are recognized as national goals to be served by collective action. National defense is the most obvious case, and improvement of the environment is the most recently recognized. The common characteristic of these goals is that the benefits for achieving them cannot be exclusively appropriated by those who pay. For example, the benefits of clean air in a city will be enjoyed by all who live or visit there, no matter who pays. The amount of resources to devote to cleaning the air cannot will be determined by the willingness of individuals taken separately to pay. Some kind of collective decision must be made, and this requires evaluation of the collective goals. Whether such cases are relatively more numerous or important than they used to be, or less well provided for, is not at issue here or particularly relevant. It is clear in any case that these collective goals need more systematic and public analysis and discussion.

Moreover, many actions of the Federal Government have important by-products beyond the purposes that initially motivated them. For example, an interstate highway is intended to speed movement from where people are to where they want to go, not to tell people where to live. But the highway must be located somewhere, and its location will influence where people live. Therefore, it is appropriate for the Government to consider whether there is any national goal for the location of the population.

The tendency to proclaim "national goals" must be watched with caution. To establish a national goal about every aspect of life, or even every aspect of life in which the action of one person affects another, would not be in our spirit. This report is confined to areas in which a national goal is already implicit in policy or where the question of recognizing or not recognizing a national goal obviously deserves consideration. More than ever, formulating these goals and acting upon them require as much informed and thoughtful foresight as the American people and their public and private institutions can muster.

## Summary

**This report is motivated by the President's explicit call for the development of a national growth policy. It is assumed that both the meaning and form of this policy will evolve and that contributions such as this are but steps in that direction. This report takes an inductive approach to the overall problem by identifying a number of**

issue areas in which it seems meaningful to say that a debate bearing on growth policy is taking place. The issues which were selected are ones which the National Goals Research Staff judged were ones on which they could make a distinctive contribution to the Nation's awareness. An example of an exclusion might be that of urban problems, a subject truly essential to our growth, but a matter much discussed by others of greater competence on that topic.

The major lesson to be extracted from the substantive problems reviewed here is the high desirability of an explicit growth policy with a relatively long-term perspective. In instance after instance, it was found that today's problems are a result of successes as defined in yesterday's terms. The object lesson has not been that our institutions are incapable, but that in the past we set performance criteria for them in terms now recognized as too narrow but which at one time were appropriate. We have become widely aware of the second-order consequences of our action, and we have demonstrated our resolution to take them into account when we can anticipate them. What we need is increased ability to anticipate those consequences and an explicit policy framework within which to evaluate them.

The central ingredient in the development of a growth policy will be for the American people to decide just what sort of country they want this to be. This process is in being, as reflected in these debates. Hopefully, this report and other events will serve as vehicles to facilitate discussion and choice. To further facilitate this process, we will have to develop better institutional arrangements for the people to relate to the leadership and better mechanisms of policy analysis to serve all parties.

While it is clear that an explicit growth policy is desirable, it seems equally clear from these debates that it is likely that what will emerge is not a single policy but a package of policies consistent with each other, each designed to meet one or more of our national objectives. This package of policies will shape both the directions of our society and the balance among the many segments of society in terms of priorities and interrelationships. It will not be a set of policies which the government alone can develop and effect. It will be a set of policies which emerge from the decisions of the government and the people, and which, in turn, will affect the decisions of both the government and the people.

## APPENDIX A

## Selected Trends and Projections

## SELECTED TRENDS AND PROJECTIONS

The chapters of the report describe several contemporary debates as they relate to the theme of balanced growth. The chapters therefore focus on the issues in their current context. However, "goals research" also deals with trend analysis, projections, forecasts, and their related implications.

This appendix illustrates how these latter types of analyses may be applied to issues of public policy. The trends and projections presented are selected because of their relevance to the basic theme of this report, balanced growth. They represent some of the social, economic, and technological trends from which the debates on growth have emerged. Charts with descriptive analysis cover economics, population, education, and science and technology. A final section touches briefly on some probable developments of the 1970's that may give rise to new social trends.

## Economy

The most important quantitative measures of the Nation's economic performance are gross national product and GNP per capita. Present estimates call for a potential 1980 U.S. GNP (in 1969 dollars) of about $1.5 trillion—an increase of about 60 percent over the 1969 total of $932 billion. (See fig. 1.) Achieving the 1980 GNP represents a sustained growth rate of about 4.3 percent a year.

Should this growth not be realized programs that are already underway might suffer and the opportunity for new initiatives in social policy might be curtailed. Thus, economic growth—the additional resources that become available from increases in the labor force, capital stock, and productivity—are necessary not only for improving the standard of living but also for affording humanitarian programs and wider opportunity.

It is difficult to forecast the GNP with great accuracy. The task is more difficult as the time period of projection is increased. The method of projection used in this appendix is, however, a simple one based on anticipated growth of labor input to the economy and on the rate of increase in productivity (or output per manhour) for both the private and public sectors. (See fig. 2.)

The input of labor is determined by population, by the participation of the population in the labor force, the employment rate, and the preferences of the labor force for income or leisure. Productivity growth is a combination of elements: the quality of labor, as measured by its educational attainment and health; the quality and quantity of the capital goods or tools used by the labor force; and by growth in the stock of knowledge, the creation of innovation, and the technology introduced into the economy from investment.

Research and technology play a significant part in economic growth: many studies show these to be among the prime sources of growth. Although it is not easy to judge the extent of the link between research and growth, it is generally concluded that an extensive reduction in university, commercial and some forms of military research and development would eventually have severe repercussions on the rate of growth.

**GNP PROJECTED FOR 1970-80**
**(BILLIONS OF 1969 DOLLARS)**

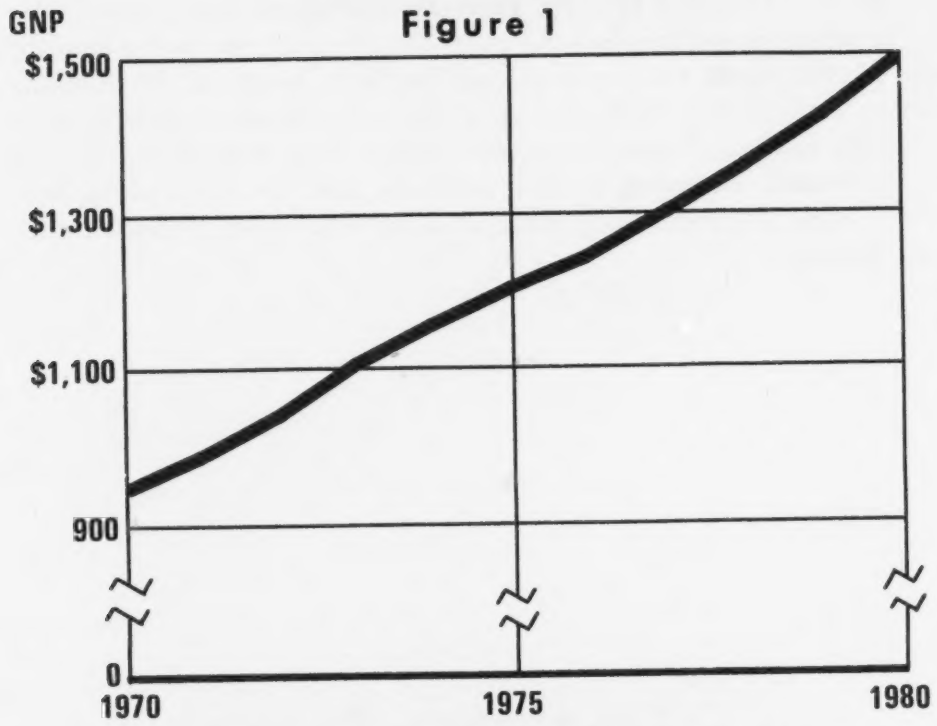
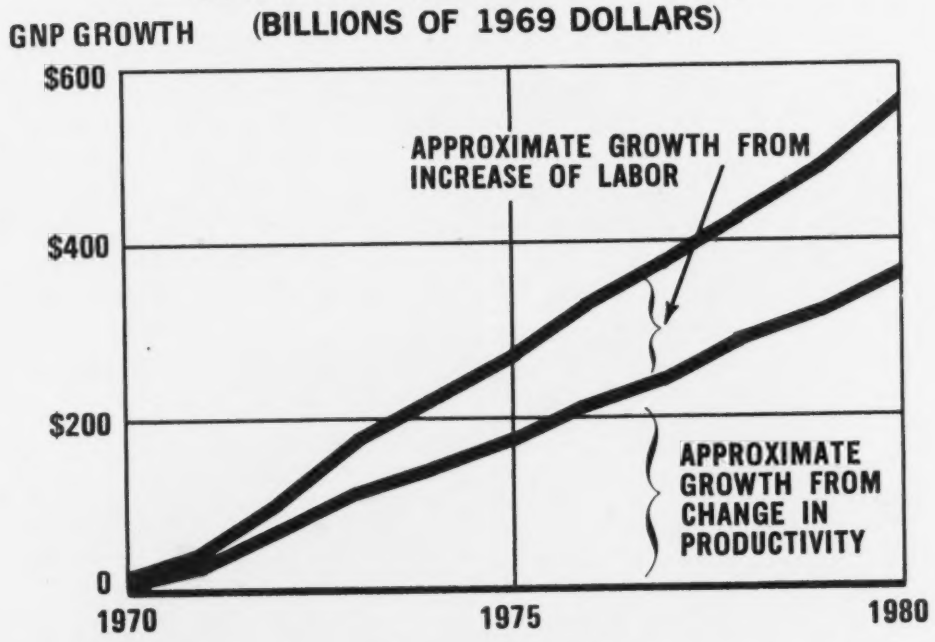



Figure 1

**SOURCES OF GNP GROWTH 1970-80**
**(BILLIONS OF 1969 DOLLARS)**




Source: Based upon data from Council of Economic Advisors in 1970 Economic Report of President and Extrapolated from 1975 to 1980.

Figure 2

Economic growth facilitates the satisfaction of an ever-growing assortment of social needs and the provision of more options to solve problems and provide increased opportunities for poorer Americans to gain access to economic benefits. Presently established claims will absorb the growth projected between now and 1973. With a lower rate of growth, these claims would come into sharper conflict. Many of the contemporary debaters who challenge our traditional concept of growth seem to believe that social tensions would lessen if their prescribed solutions were executed. However, if these solutions had the effect of limiting growth, then it is more likely that social tensions would increase rather than decrease.

FIGURE 3.—*Gross national product, 1969 and projections for 1970–75*

[Billions of dollars, 1969 prices; calendar years]

| Claim | 1969 actual | Projections | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
| Gross national product available | 932.3 | 944 | 980 | 1,042 | 1,103 | 1,150 | 1,200 |
| Claims on available GNP | 932.3 | 944 | 980 | 1,042 | 1,100 | 1,144 | 1,188 |
| Federal Government purchases | 102.0 | 93 | 89 | 88 | 87 | 87 | 86 |
| State and local government purchases | 112.7 | 116 | 120 | 125 | 131 | 137 | 142 |
| Personal consumption expenditures | 576.0 | 594 | 620 | 664 | 704 | 735 | 769 |
| Gross private investment | 141.7 | 141 | 152 | 166 | 178 | 186 | 192 |
| Business fixed investment | 99.3 | 103 | 105 | 111 | 116 | 120 | 125 |
| Residential structures | 32.2 | 29 | 34 | 40 | 46 | 49 | 49 |
| Other investment | 10.1 | 10 | 14 | 15 | 16 | 17 | 18 |
| Excess of claims | 0 | 0 | 0 | 0 | −3 | −6 | −12 |

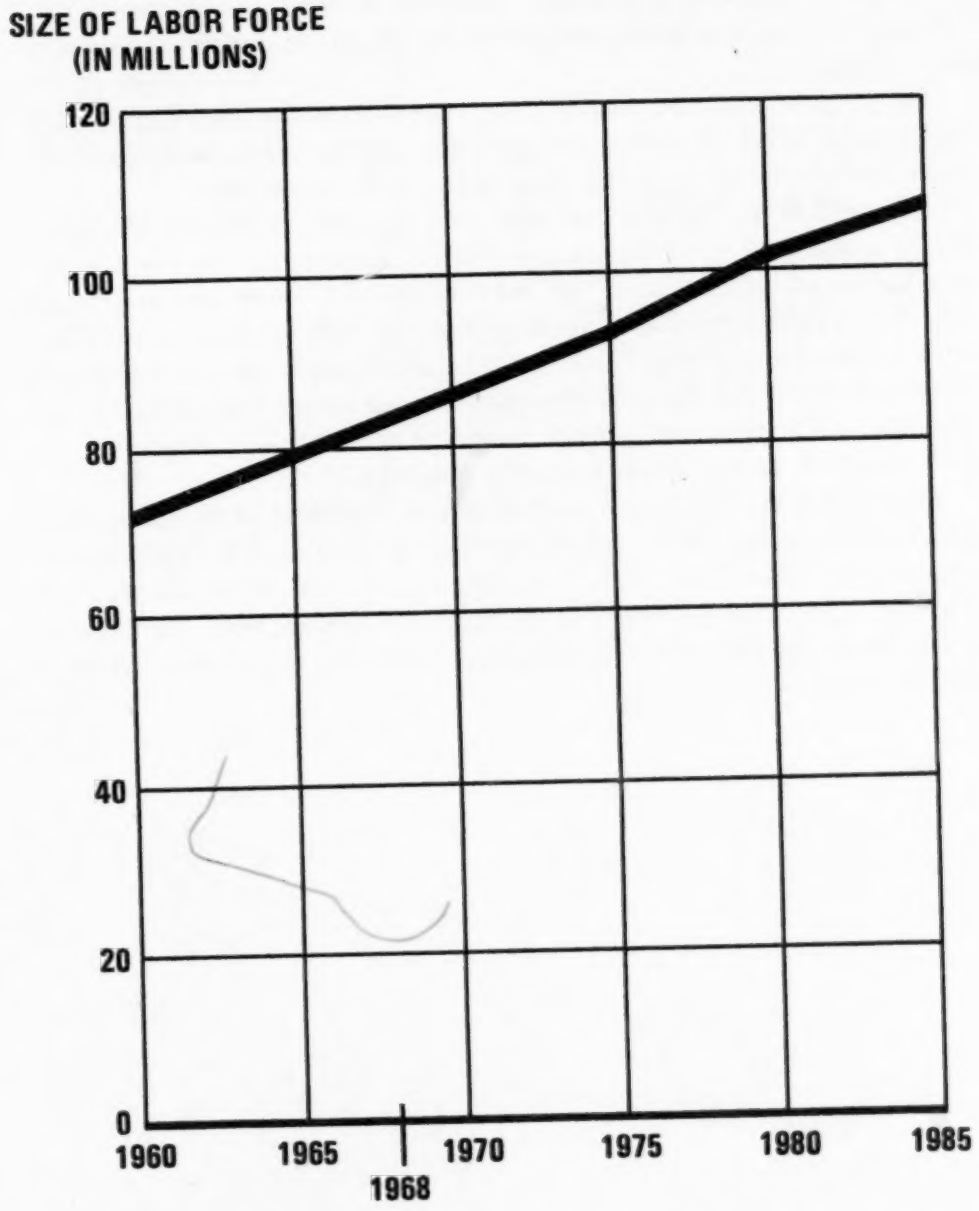
NOTE.—Projections are based on projected Federal expenditures and their influence on various components of GNP.

Detail will not necessarily add to totals because of rounding.

Source: Council of Economic Advisers, Economic Report of the President, February 1970, p. 79.

The labor force is a basic resource through which to achieve growth and to afford new opportunities for the country. By 1980 there will be about 18.5 million more people in the labor force than in 1968 (fig. 4). This force will have a substantially higher proportion than now of younger persons, those between 25 and 34 years of age. This influx of youth should enhance flexibility in redirecting some areas of the economy and in launching new activities. These younger people can be initially trained for newly required skills. It is also generally felt that retraining is more effective if it occurs early in one's career. In addition, the risks are less if one tries new things while still young and has few vested interests.

## SIZE OF LABOR FORCE




Source: Bureau of Labor Statistics.

Figure 4

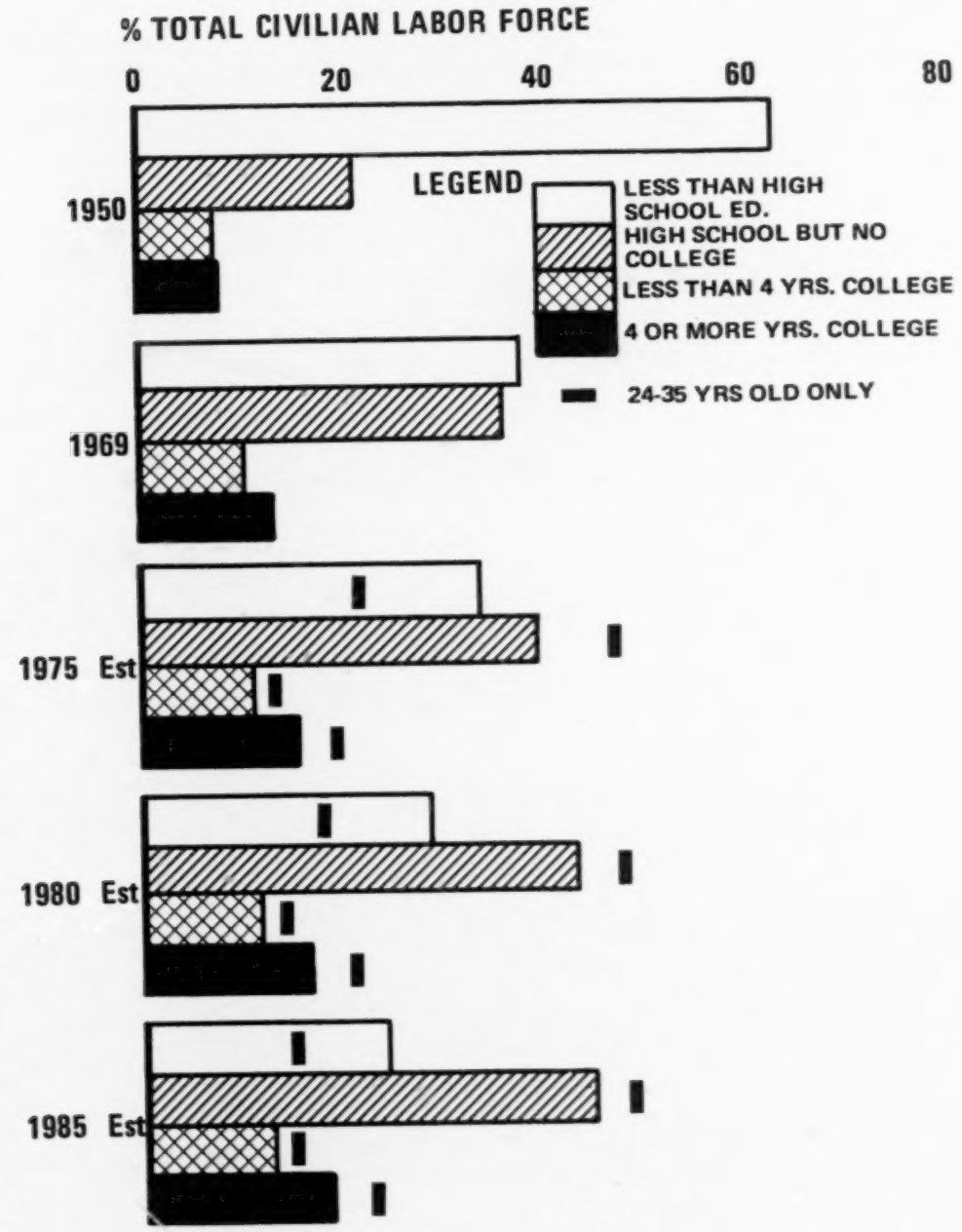
By 1980, the Nation's labor force as a whole will be significantly better educated than today (fig. 5). Underlying trends toward complexity have been shown to prevail in all of the debates. There is hope that we are growing in our ability to manage and adapt to this growing complexity. The educational level of the Nation's labor force is an important aspect of that ability.

The proportionate increase in young members of the labor force and in the general level of education promises greater adaptive capabilities during the 1970's than has been true of any previous decade.

The chapter on "Education" discussed the issue of whether the number of years spent in educational pursuits accurately reflects corresponding degrees of intellectual or skill development. If more and more high school and college graduates are not attaining skills necessary for dealing with a complex and rapidly changing society, then the inferences drawn previously from the data on these charts may prove unfounded. If the potential influence of education on the adaptability of our economy is to be realized, these questions must be resolved.

Despite the marked improvements in the education of the labor force anticipated for the 1970's, 1980 will find an estimated 4.7 million persons in the labor force with less than a high school education. This suggests a continuing, though hopefully diminishing, need for national attention to the manpower training and economic opportunity needs of such persons.

## EDUCATIONAL CHARACTERISTICS OF THE CIVILIAN LABOR FORCE 25 & OVER 1950-1985



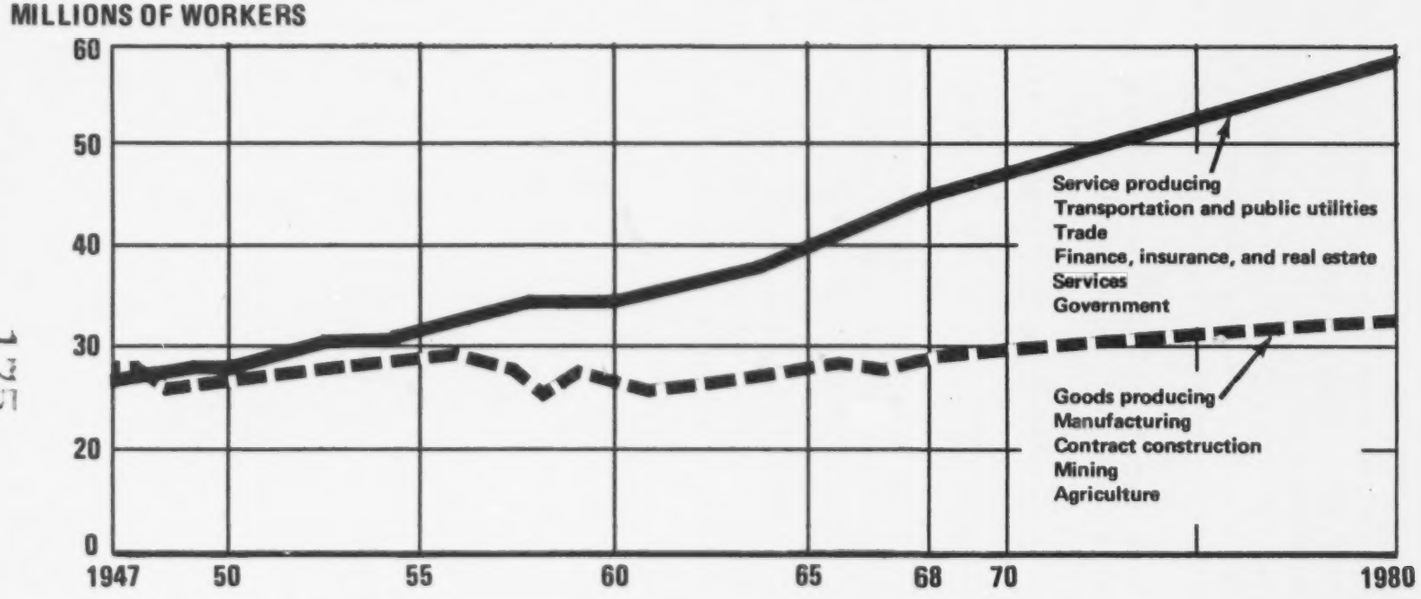

Source: Bureau of Labor Statistics.

Figure 5

Figure 6 illustrates the further transition of the economy into one in which most of the labor force is engaged in service activities. Should present trends continue, by 1980 more than twice as many individuals will be employed in service activities than are employed in goods producing activities. This is one of the main reasons some scholars are beginning to refer to our country as a "post industrial" society.

The transition to a predominately "service economy" has important implications for the future character of our society. It is projected that most of the growth in employment will be absorbed in the services sector.

## EMPLOYMENT[1] TRENDS IN GOODS-PRODUCING AND SERVICES-PRODUCING INDUSTRIES, 1947-68 (ACTUAL) AND 1968-80 (PROJECTED FOR A SERVICES ECONOMY WITH 3-PERCENT UNEMPLOYMENT)




[1]Wage and salary workers only, except in agriculture, which includes self-employed and unpaid family workers.

Source: Bureau of Labor Statistics.

Figure 6

The transition from a goods-producing to a service-oriented economy has implications for the growth of productivity of the economy. Traditionally, most advances in productivity, as has been noted, have occurred in goods-producing rather than service industries.

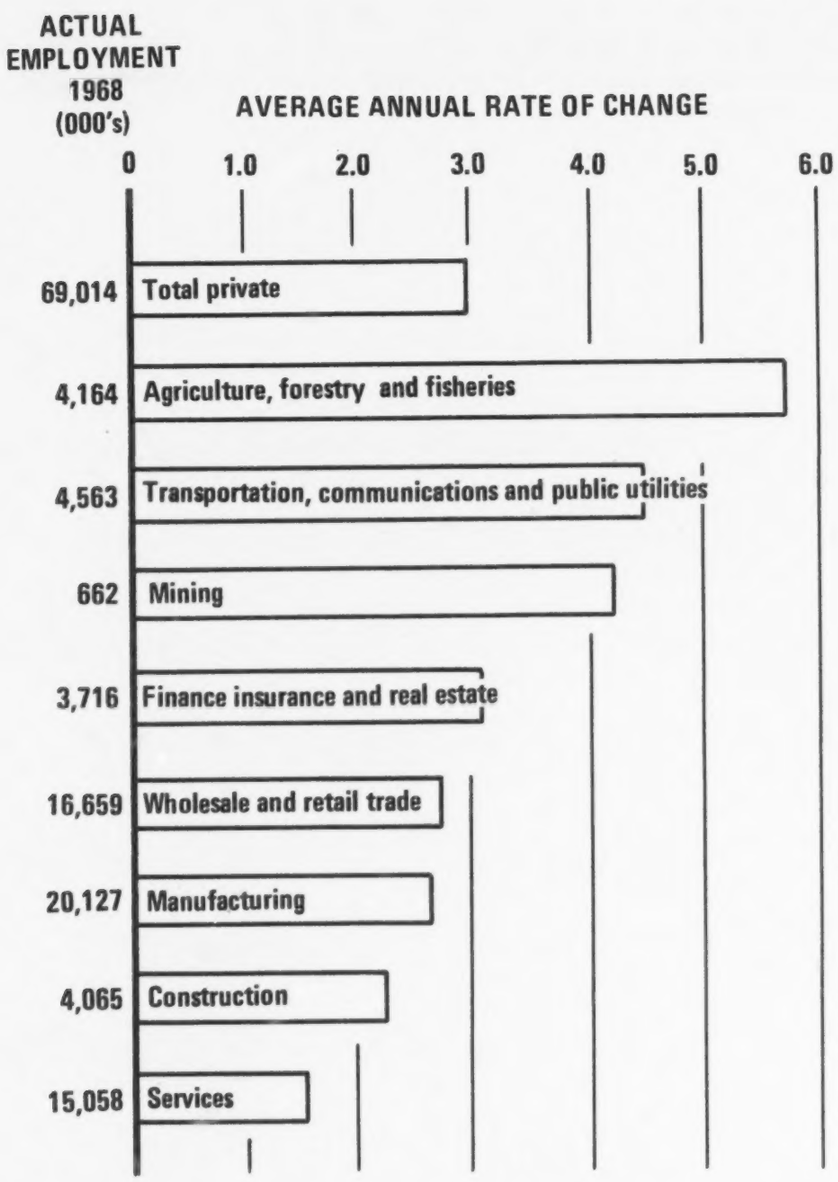
Figure 7 shows the projected rates of productivity increases in key industries for the 1970's. Estimates for increased productivity within government are not available.

One implication of these projections is that there might be fewer social problems created by technological unemployment as the manufacturing portion of the labor force becomes smaller, and there might be less growth in real GNP.

When the future technology of the service industries is considered, the long run growth of employment is less certain. A number of technological developments likely to occur in the 1970's raise doubt as to the validity of the projection for productivity increases within the service industries. For example, computers up to now have been used largely in routine record-keeping functions. Now they are being combined with a variety of electronic and communication devices such as picture phones and television in ways that show considerable promise for increasing productivity in such service industries as medicine, law, education, financial analysis, business decisionmaking, and government.

We can also anticipate that service industries will conduct more research toward technological innovation to deal with rising costs—particularly the cost of labor. This increases the possibility that productivity in the service industries is likely to be greater in the future than has been projected.

## PROJECTED PRODUCTIVITY, BY MAJOR SECTOR, PRIVATE ECONOMY, 1968-80




Source: Bureau of Labor Statistics.

Figure 7

Figure 8 reflects substantial reductions over the past 40 years in disparities in per capita incomes between major regions. Thus, in 1929, the Northeast and North-central areas of the Nation had 64 percent of the Nation's population and 75 percent of all personal income. But from 1929 to 1967, the South and West increased their share of the Nation's population by one-sixth and income by one-half.

If present trends continue for the next three decades, the remaining absolute regional differences in per capita income will be reduced by about 40 percent.

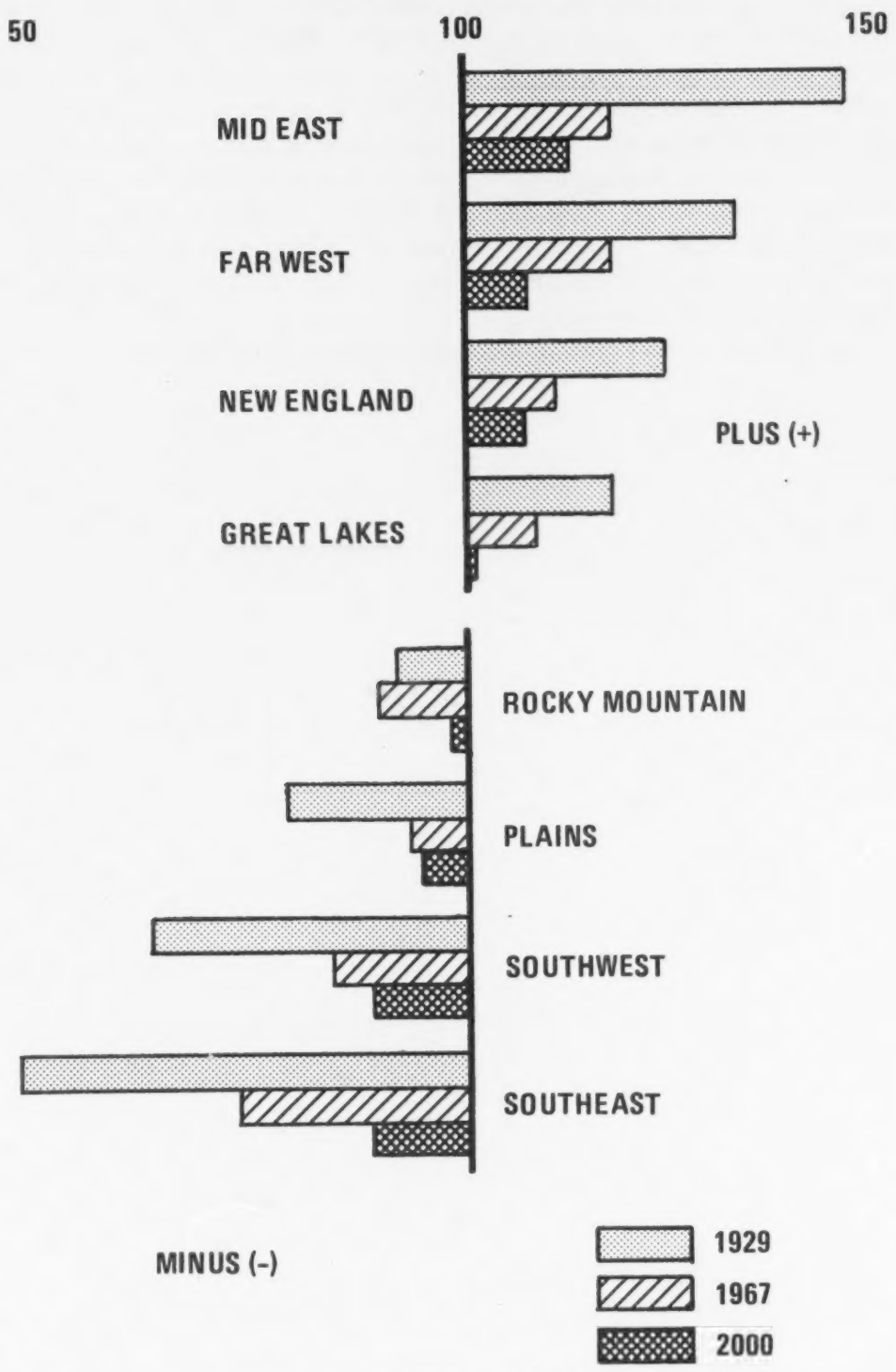

RELATIVE DIFFERENCE AMONG REGIONS IN
PER CAPITA PERSONAL INCOME
PERCENT OF U.S. (U.S. = 100)
50
100
150
MID EAST
FAR WEST
NEW ENGLAND
GREAT LAKES
ROCKY MOUNTAIN
PLAINS
SOUTHWEST
SOUTHEAST
PLUS (+)
MINUS (-)
1929
1967
2000

Figure 8

## Population

The chapter on "Population" discussed several long-range options for how the Nation's population might be distributed in the year 2000. That chapter also emphasized that many of the decisions which determine that distribution will be made during the 1970's. Through alternative forecasts, one may gain insight into what will be involved in any effort to achieve, by the year 2000, a goal of balancing the distribution of the U.S. population between the 12 largest metropolitan areas (collectively referred to here as "megalopolis") and the rest of the country. The first reference point is the projected consequence of present trends. These trends would result in about 70 percent of the total U.S. population living in the 12 metropolitan areas, with more than half of the total in the three largest of these areas.

Figure 9 shows how this outcome would appear geographically.

## URBAN REGIONS

Figure 9

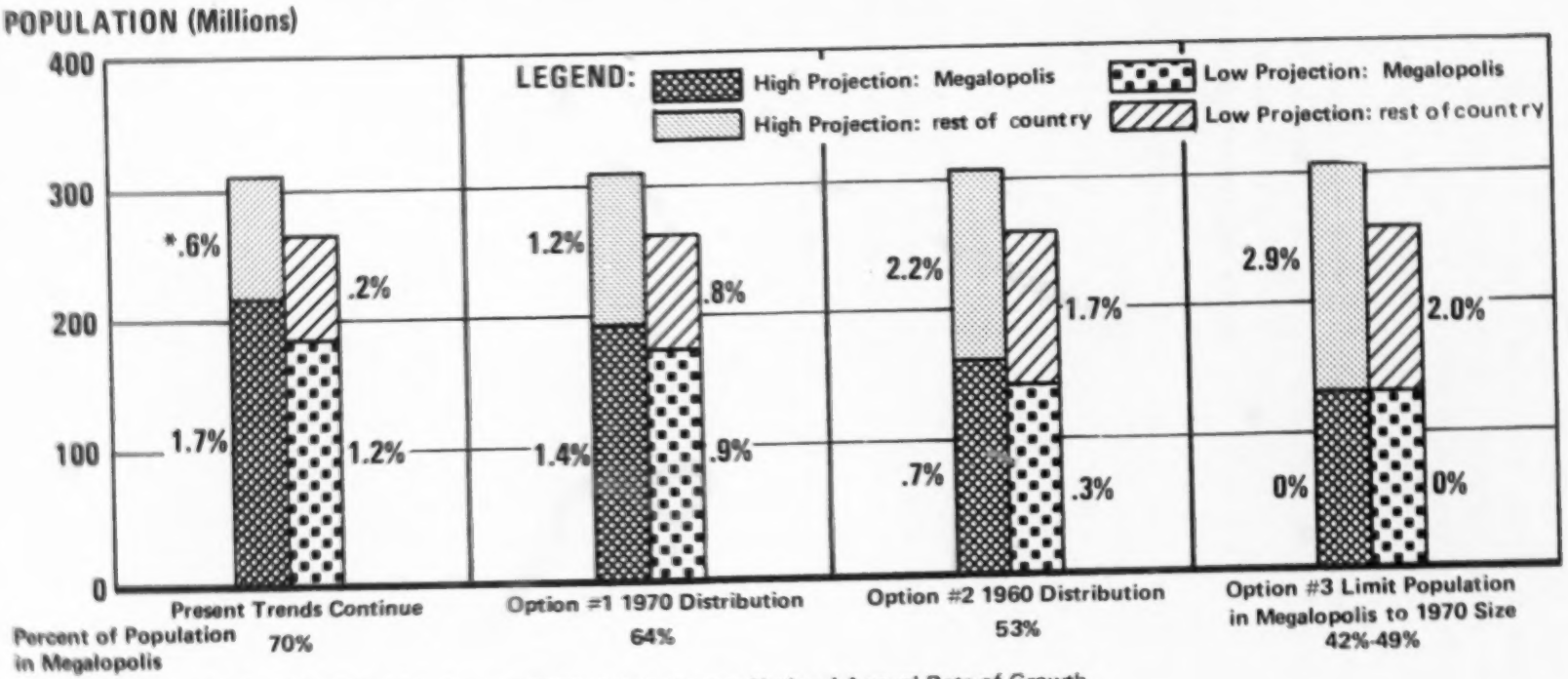
What results might be expected from various national goals for population distribution in the year 2000? Figure 10 shows the contrasts between a projection of present trends, under three alternative options for distribution, and with two assumptions about population growth: 100 million or 60 million more Americans by the year 2000.

The three options for population distribution are: (1) holding the *proportion* of total population in megalopolis to the 1970 level (about 64 percent); (2) returning to the 1960 *proportion* of total population in megalopolis (about 53 percent); and (3) holding the absolute size of the megalopolis to the 1970 level of approximately 129 million persons.

Only the last option would preclude further growth within each megalopolis. Such a goal would probably be unachievable, but it is depicted here to see if the resultant rate of growth in the remainder of the country appears reasonable. Under this option, and assuming the total population would increase by 100 million, the remainder of the country would have to grow in population at 2.9 percent a year. This rate of growth could probably be absorbed only with massive and rapid shifts in public and private investments. Moreover, it would probably require stringent policies which are inconsistent with American values to achieve a "no growth" population for the megalopolis. For these reasons, the third option does not appear feasible.

Though this analysis does not attempt to suggest any specific redistribution, it does suggest that the growth pressures on the country outside the megalopolis would be more manageable under either option 1 or 2. Also, the growth constraints which these options would place on the megalopolis would be reasonable and should not lead to stagnation or decline—an important objective of any redistribution goal.

## OPTIONS FOR POPULATION DISTRIBUTION IN YEAR 2000
Megalopolis (12 largest Metropolitan regions) and rest of country



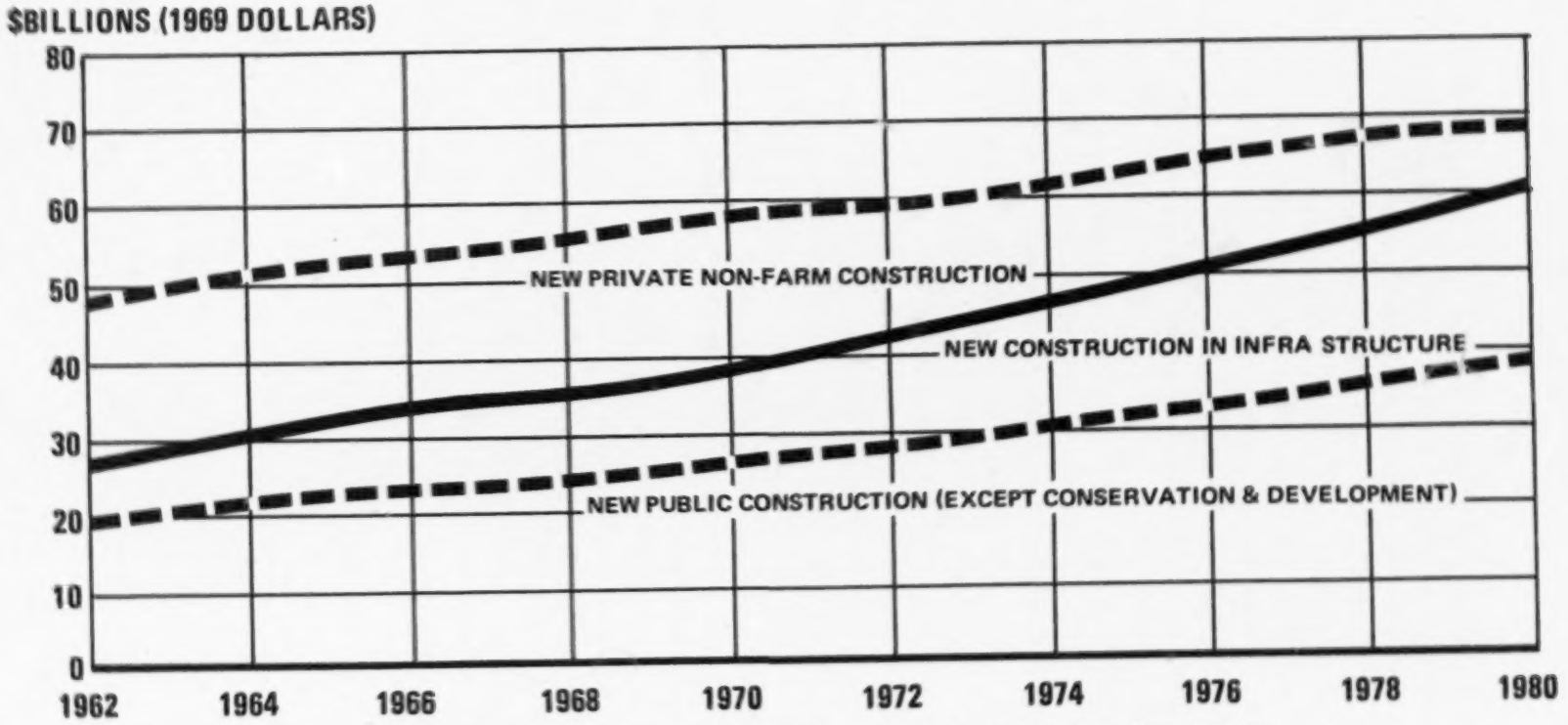

High Projection: U. S. adds 100 million by year 2000; 1.35% Average National Annual Rate of Growth.
Low Projection: U. S. adds 60 million by year 2000; .9% Average National Annual Rate of Growth.
*Percentages indicate Average Annual Growth Rate 1970-2000.
Source: Based on Projections by J. Pickard, HUD

**Figure 10**

The feasibility of any redistribution goal is largely determined by the extent to which it requires additional investment expenditures beyond those that are already projected. It is estimated that during just the 1970's about $1.5 trillion will be allocated for both public and private nonfarm construction, including infrastructure development. (Infrastructure development consists of public and private noncommercial and nonindustrial buildings such as those for religious, educational, or hospital purposes, public utilities, highways and streets, sewers, and water systems.) These amounts are projected to be allocated for these purposes whether or not there is a national policy to redistribute population and regional economic opportunity. If there is no such policy, in all probability the investments will strongly reinforce existing concentrations of population and economic activity in megalopolis.

On the other hand, a policy to influence more balanced growth, e.g., to foster the development of alternative growth centers outside the megalopolis, could be carried out by redirecting a portion of the anticipated construction and infrastructure investments of both the private and public sectors. Assuming, for example, that 10 percent of the private and public sector investment that is projected to be available for construction over the next decade were to be diverted to new growth centers, some $150 billion would be available in the 1970's for new growth centers. Thus, there is a considerable pool of resources that could be tapped for purposes of effecting population redistribution. (See fig. 11.)

## ANNUAL VALUE OF NEW CONSTRUCTION




PROJECTIONS BASED ON ASSUMED CONTINUATION OF 1962-68 AVERAGE ANNUAL GROWTH RATE

Source: Bureau of Labor Statistics.

**Figure 11**

## Education

How much might the Nation be spending for education in 1980? Figure 12 shows a range of choice for 1980 by projecting estimates of educational expenditures under five different assumptions.

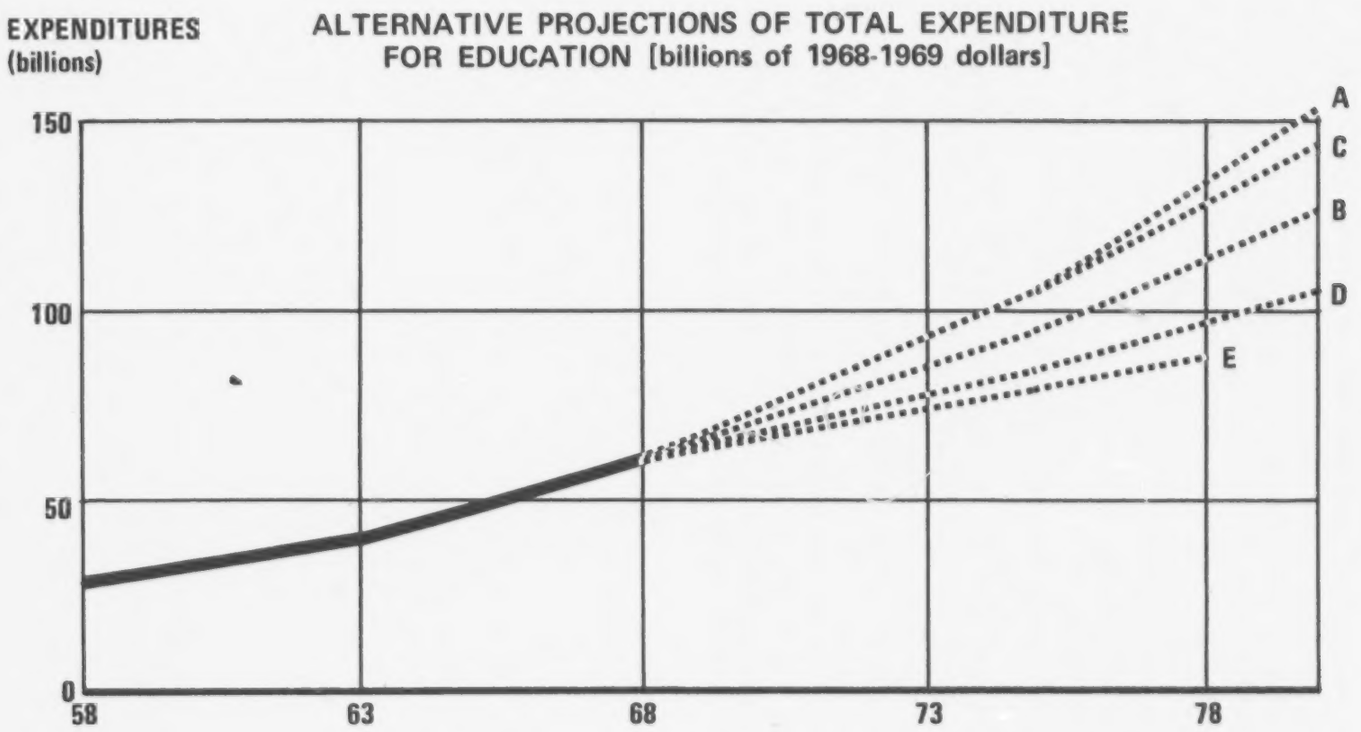
The "A" line assumes that the percent average annual rate of growth experienced from 1959 to 1969 is retained throughout the 1970's. Should this occur, by 1980 the Nation will be investing approximately 150 percent more in its educational system than 1968. Since this is the highest estimate, the question must be asked whether the educational system is capable of using the additional funds ($91 billion by 1980) effectively. Massive remedial programs for disadvantaged children and widespread use of computer-assisted instruction are examples of programs which might absorb such a high level of expenditure. Another question is whether or not the Nation should pursue this option, in terms of what it would like to achieve. Unfortunately, as is pointed out in the chapter on "Education," we have not yet learned fully how to relate desired educational outcomes to available or potential resources. Unless both understanding of the learning process and the measurement of educational output are improved during the 1970's, we will still not know the answer to this question in 1980—despite additional investments.

If, however, the declining rate of growth experienced in 1968 and 1969 represents the trend for the 1970's, we shall increase our spending only by 100 percent instead of 150 percent, reaching a level of $126 billion in 1980—line "B."

Line "C" assumes that educational expenditures during the 1970's will take the same proportion to GNP as it took from 1959 to 1969.

Line "D" reflects the results of an option to base overall growth in educational expenditures upon a decision that the 1980 expenditures should be the same precentage of GNP as in 1969.

Line "E" reflects the Office of Education's estimated expenditures based upon a combination of population, enrollment, and per capita cost projections.




Source: Office of Education.

Figure 12

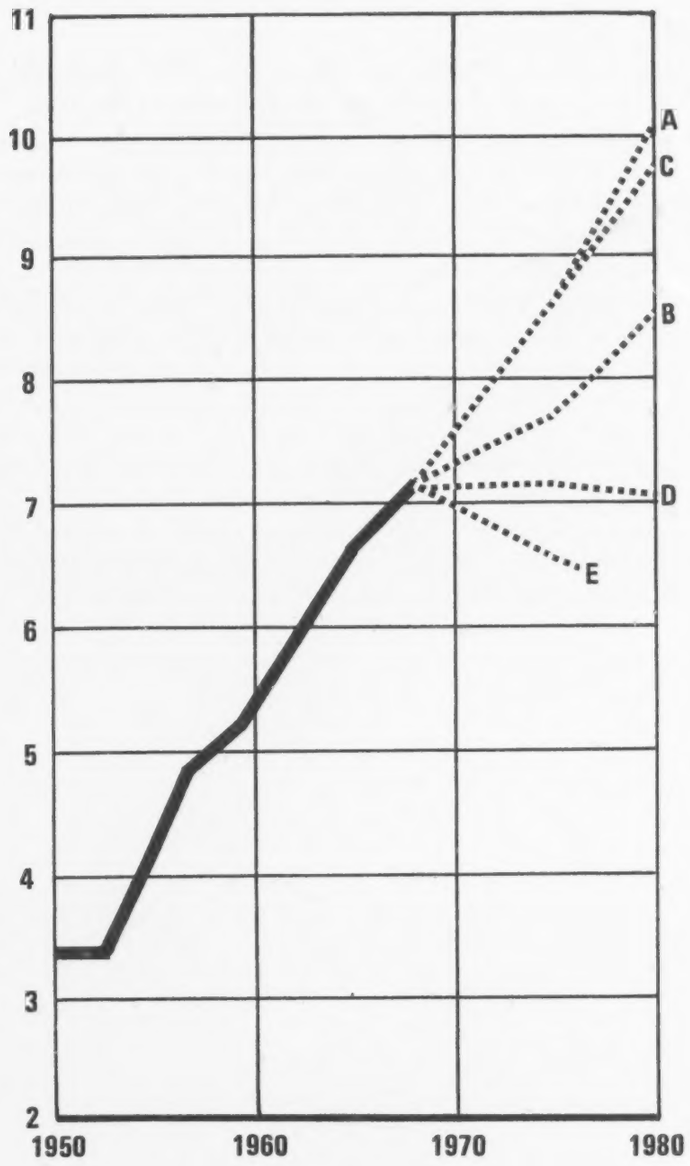
What do each of the preceding estimates suggest about priority? Though imperfect and grossly oversimplified, a common way to assess the priorities the Nation is assigning to various pursuits is to compare the portion of GNP assigned to them over time. This approach assumes that if educational expenditures are commanding increasing proportions of GNP, and if the relative price of education is the same, then education is receiving increasing priority. If, on the other hand, educational expenditures are receiving a decreasing allocation of GNP, then education is receiving less priority. On this basis, figure 13 shows that for the last two decades, education has been receiving relatively higher priority than other activities.

The chart also shows that the degree to which educational expenditures will continue to command this priority in the 1970's depends on which of several options the Nation chooses.

Projections in this figure show the relative priority reflected by each of the five expenditure patterns previously discussed. This is done by relating the estimated educational expenditures to the estimated GNP.

Given the imperfection of this way of judging priority, any one of the first three projections makes the assumption that education will continue to receive a relatively higher priority than other activities.

## % GNP ALLOCATED TO EXPENDITURE ON EDUCATION




Source: Office of Education

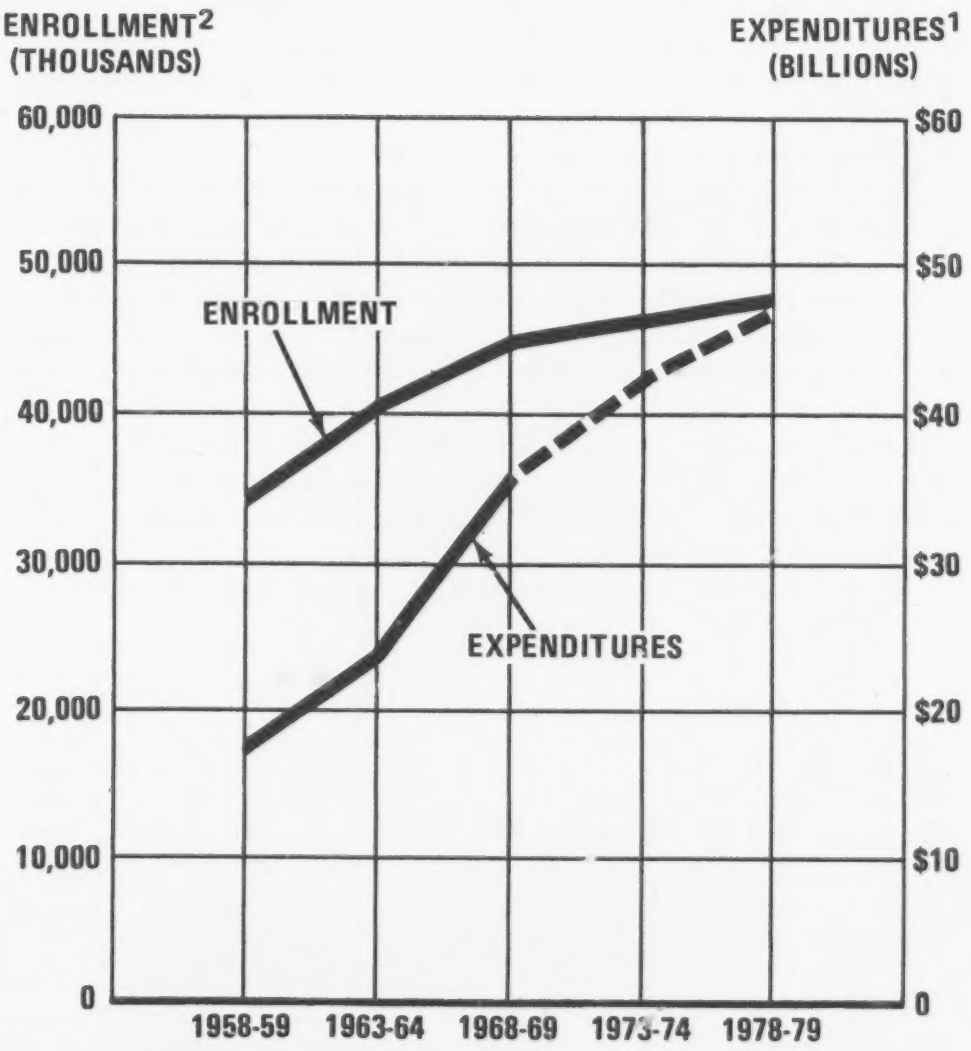
**Figure 13**

A primary determinant of growth in the size of the educational system has been the demands placed on it by population growth. Since most States require that children between the ages of 7 and 16 attend school, there is a special responsibility for elementary and secondary education to grow along with increasing numbers of potential students. Figure 14 shows that pressures from growth in enrollments for elementary and secondary education will ease during the 1970's. But data to be presented later shows that this is not true for higher education. As was shown in the chapter on "Education," the Nation has achieved essentially universal secondary education. Some would have us now strive for universal higher education as a national goal and a basic human right.

Figure 14 indicates that the growth in expenditures for elementary and secondary education has been more rapid than the increase in enrollment. This reflects accommodation to a variety of other factors including the low rate of growth of productivity expanding the range of curricula, equipping our schools with improved facilities, and giving teachers better incentives—all of which are assumed to contribute to improved quality of education.

The projection to 1980 of the relationship of expenditures to enrollment is based upon the "E" line assumption in figure 12. It has been noted that this is the lowest of the expenditure projections. Accordingly, we could conclude that even if this lowest option were followed, there would still be a qualitative increase built into the growth.

## ENROLLMENT AND EXPENDITURES[3] FOR PUBLIC ELEMENTARY – SECONDARY EDUCATION: 1958-59 TO 1978-79[1]




[1]Amounts in 1969 dollars.
[2]Regular day schools only.
[3]Current and capital.
Source: Office of Education.

**Figure 14**

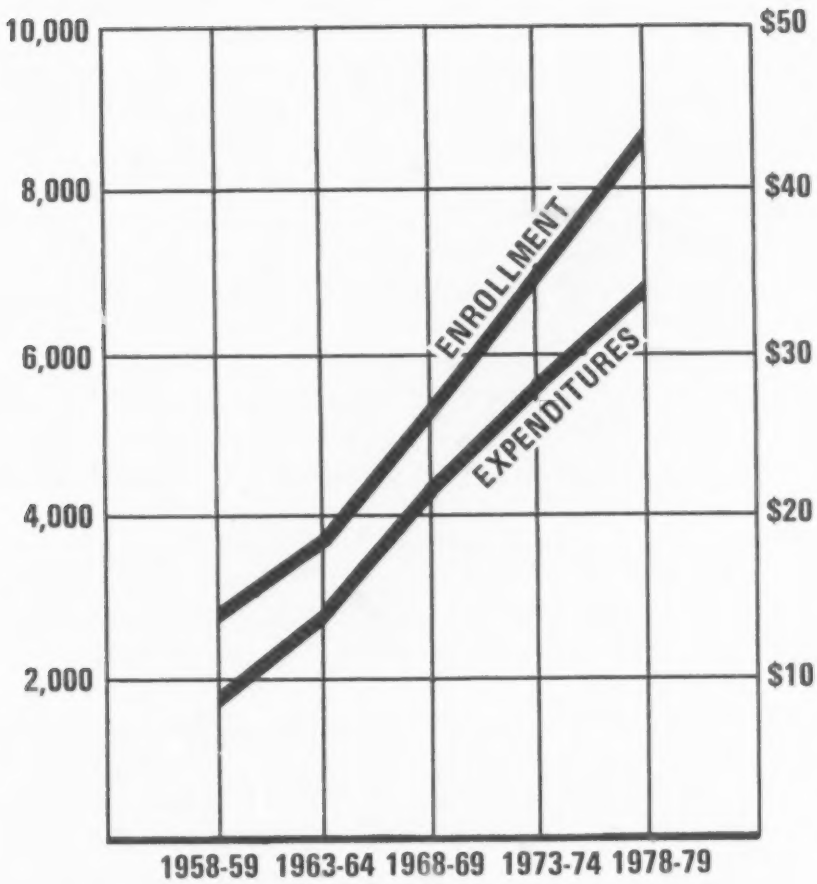
Figure 15 shows the enrollment trends for higher education, compared to the expenditures for higher education. Contrary to the estimates for elementary and secondary education, enrollments in higher education are expected to increase substantially during this decade and will generate pressure for more growth in expenditures.

An equally significant contrast to the trends in elementary and secondary education is that the total expenditures for higher education have not increased as rapidly as the increase in enrollments. A projection of the expenditures for line "E" of figure 12 reflects the fact that if we continue to permit the enrollments to grow as expected, then we will be spending slightly less per student in higher education in 1980 than we were in 1969. This would be true despite a more than 60-percent increase in total expenditures for higher education.

It has been said that many of our colleges and universities are already overcrowded, while others struggle for existence with student bodies too small to be economical. Many argue that the quality of higher education is not what it should be. These factors, together with the estimated enrollment and expenditure trends, are likely to generate new or more intense pressures during the 1970's for growth in expenditures for higher education.

A major decision confronts the Nation on whether or not to provide universal higher education. The question is complicated by the traditional view of our society toward schooling as an inherently good thing. Whatever the choice, there will be a significant impact on the nature and magnitude of funding required for the schools. The funding implications are shown in figure 16.

## ENROLLMENT[1] AND EXPENDITURES[2] FOR HIGHER EDUCATION 1958-59 TO 1978-79[3]




[1]Enrollment is full-time equivalent in public and non-public institutions.

[2]Includes current and capital outlay (educational and general [includes research] auxiliary enterprises and student aid).

[3]Amounts in 1969 dollars.

Source: Office of Education.

**Figure 15**

An important question for the Nation is whether it wants to guarantee a higher percentage of its high school graduates immediate access to higher education. Figure 16 shows the economic consequences of increasing first-year college enrollment by 10 and 20 percent. Achieving such increased aspirations would require increased expenditures of about $5 and $10 billion respectively by 1980 (in 1969 dollars).

These data cast no light upon such fundamental issues as whether 67 percent, 77 percent, or any other percentage of high school students are intellectually equipped to benefit from higher education.

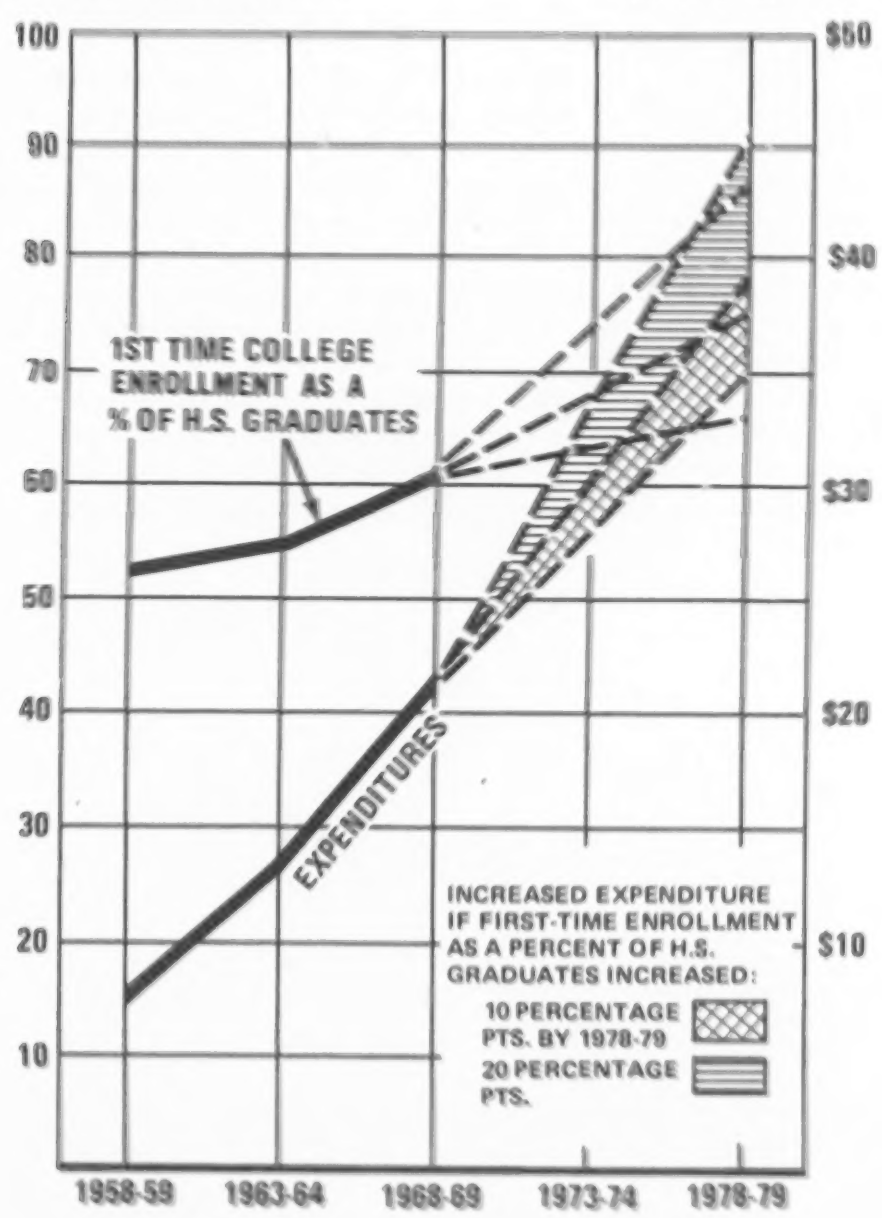
All of these factors will add fervor to the debates throughout the 1970's. But it seems clear that if the Nation wishes to make a commitment to greatly increasing the opportunity for more of its young to pursue higher education, the resources will have to grow more rapidly than in the past.

As was discussed in the chapter on "Education," education is being seen more and more as a process involving people throughout their lives. However, a central focus of our goals for opportunity to higher education is upon the young within the years shortly after they graduate from high school. This is best represented by the percentage of high school graduates who are first-time enrollees in institutions of higher education.

Figure 16 shows that the percentage of first-time degree credit enrollment in higher education as a percentage of high school graduates in the same year has been gradually increasing, but was still only 60 percent in 1968–69. If present enrollment trends continue, the number will be about 67 percent in 1980.

The chart also reveals that, even though expenditures for higher education have not increased more rapidly than total enrollments, these expenditures increased much more rapidly than have the percentage of high school students enrolling for the first time. This reflects the extension of time for higher education due to more graduate work, and perhaps the increasing number of adults who find it necessary or desirable to enroll for further education.

## FIRST-TIME DEGREE-CREDIT COLLEGE ENROLLMENT AS A PERCENT OF HIGH SCHOOL GRADUATES AND HIGHER EDUCATION EXPENDITURE 1958-59 TO 1978-79[1]




[1]Amounts in 1969 dollars.
Source: Office of Education.

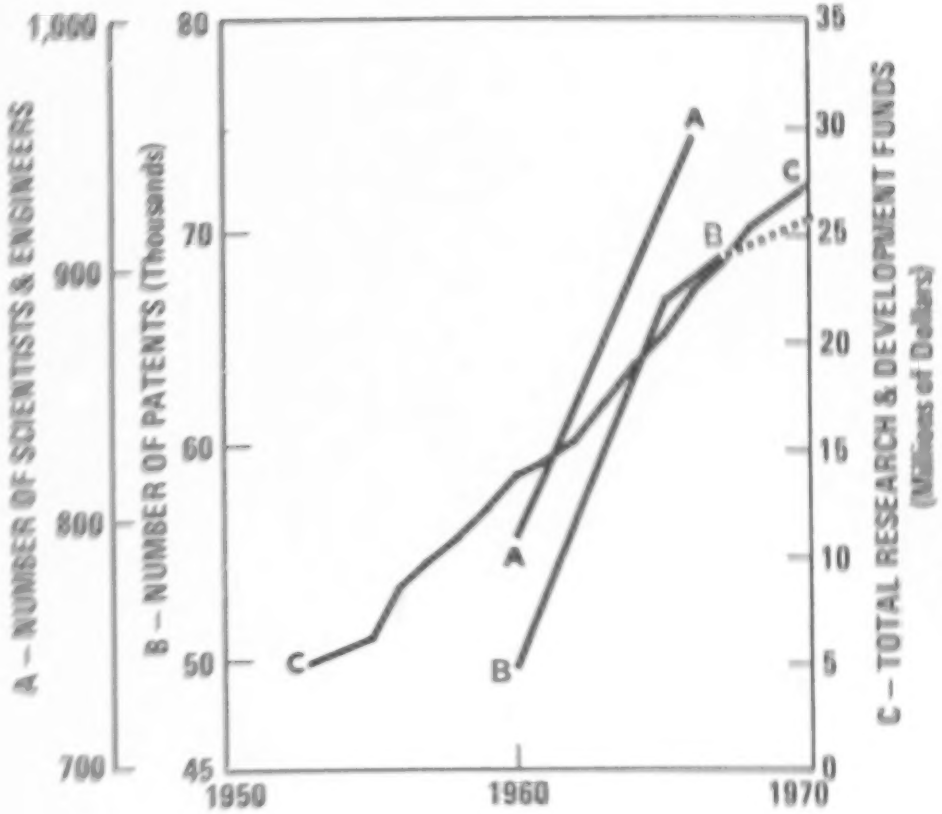
Figure 16

## Science and Technology

*During the 1960's, scholars and policymakers became more fully aware that change was becoming greater in scale and more pervasive in its effect, and was being more rapidly infused into social systems than ever before. Scientific and technological developments are important determinants of this change. Through such developments, new ways were found to do things more efficiently and to solve formerly insoluble problems. This meant not only that we could meet established needs, but that we could raise our aspirations. For these reasons, trends in science and technology are important social indicators.*

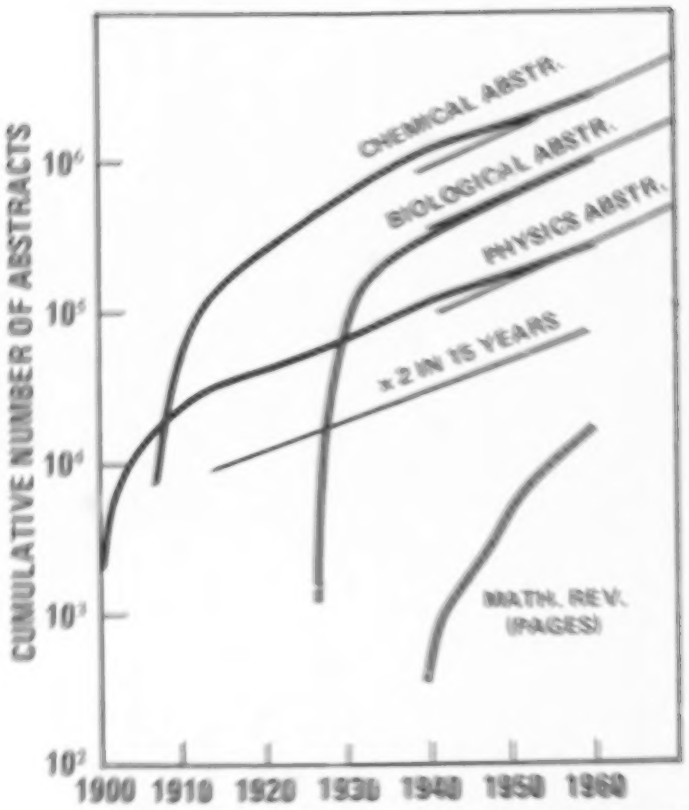
From World War II to the late 1960's, science and technology underwent rapid and sustained growth. Figures 17 and 18 show this through trends in four important indicators of activity. Two of these trends might be called "inputs" into science and technology. These "inputs" are the number of scientists and engineers and the level of expenditures for research and development. The other two, patents and scientific publications, are generally regarded as important indicators of the outputs; although the actual outputs themselves are such derivatives of knowledge as agricultural productivity, cures or treatments for illness, new fabrics, atomic energy, jet aircraft, space technologies, and rapid communication.

The chart is limited to past trends, no projections having been made because budgetary changes occurring in the late 1960's began to change past growth trends. The charts which follow show the beginning of these changes.




Source: Statistical Abstract of the U.S. 1969.

Figure 17




CUMULATIVE NUMBER OF ABSTRACTS IN VARIOUS SCIENTIFIC FIELDS, FROM THE BEGINNING OF THE ABSTRACT SERVICE TO GIVEN DATE

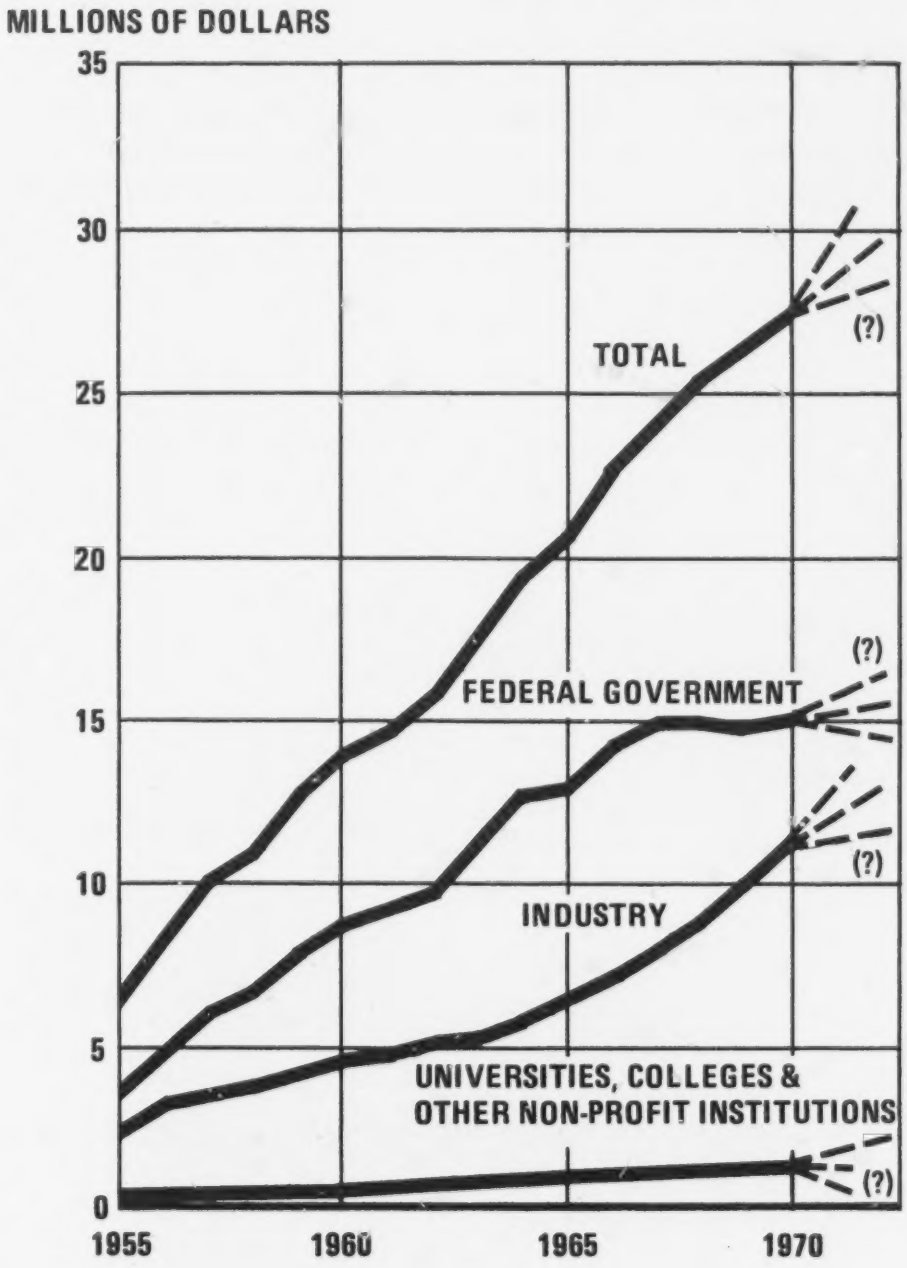
Figure 18

The budgetary decisions of the late 1960's that may set new trends for science and technology in the seventies involved a leveling off of growth in expenditures for research and development. Therefore, a clear look at these expenditure trends is needed.

Figure 19 reveals that the crucial decisions which have resulted in leveling of growth in research and development expenditures were made by the Federal Government from about 1966 to 1970. Growth of research and development in the industrial sector continued. The future significance of the Federal action is not clear. It may simply be a result of redirecting the past emphasis in Federal research and development which has been heavily concentrated in defense, space, health, and atomic energy, or it may mean a basic shift in the relative overall priority given Federal funding of research and development efforts.

On the other hand recently, there have been developments that cause uncertainty in projections of growth in scientific and technological trends for the 1970's. These are the challenges posed by many of the debates discussed in this report—particularly in the chapters on the environment, technology assessment, and basic science.

## RESEARCH AND DEVELOPMENT FUNDS



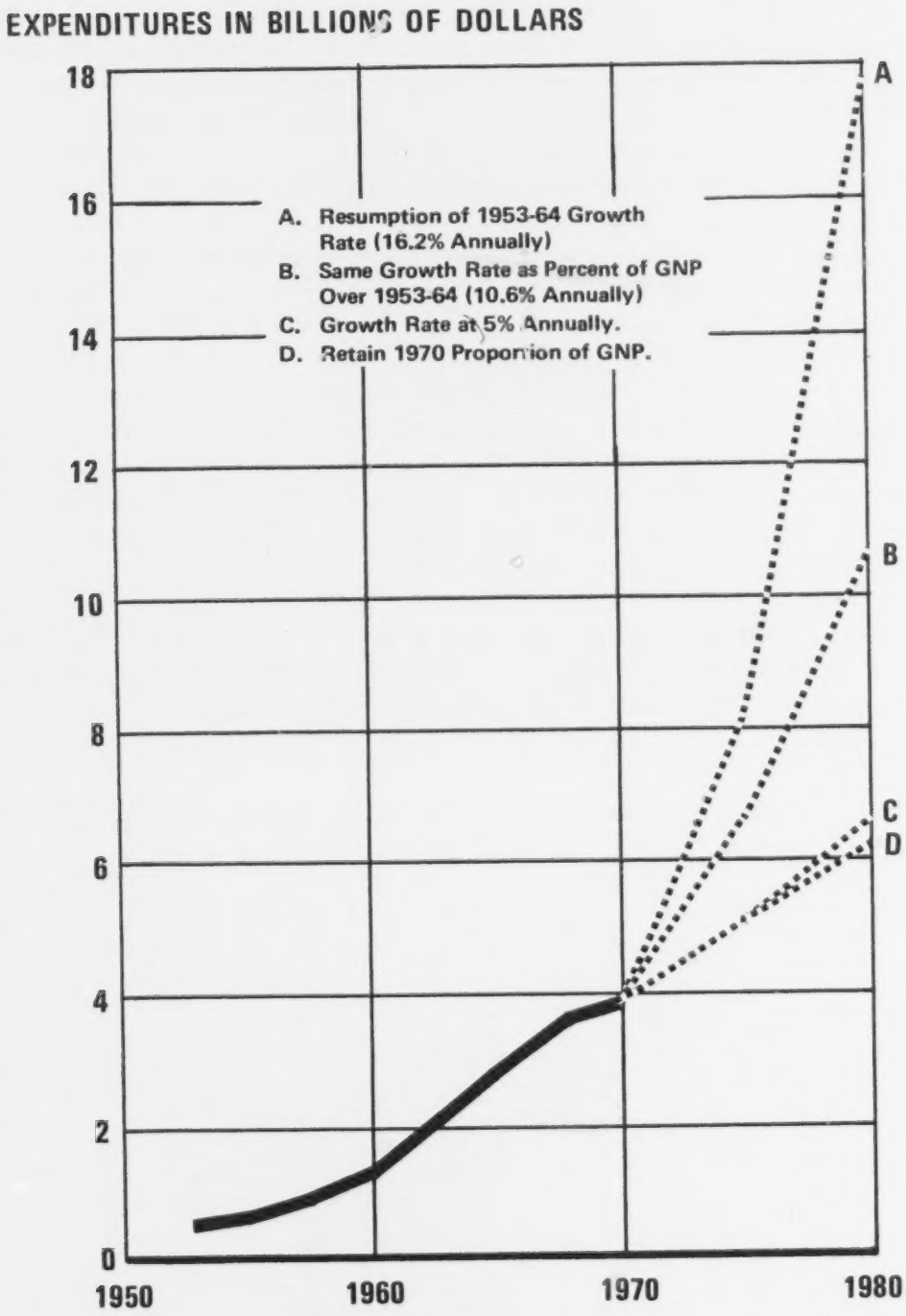

Source: National Science Foundation.

**Figure 19**

Several alternative projections for funding of basic research were developed and are reflected in figure 20.

As discussed in the chapter on "Basic Science," a growth of 5 percent annually would just offset the increase in the overall cost of basic research due to the increasing sophistication and the increasing costs of doing basic research. While any one criterion of scientific "output" has its difficulties, this data suggests that (by *one* way of calculating output) the basic science effort could be regarded as not growing even though its funds grew slightly faster than GNP.

## PROJECTION OF BASIC SCIENCE EXPENDITURES TO 1980




Source: National Science Foundation.

**Figure 20**

Another important relationship of scientific and technological developments to economics, to national growth policies, and to related national goals involves the role of so-called techonology intensive products in world trade. These are products that are at the advanced state of the art in terms of technological performance and design as well as products that rely heavily upon research and highly trained technical manpower for their design and production. The rate of technological obsolescence of such products in recent years suggests that a continuing and sustained research activity is essential to maintaining predominance in technologically intensive products.

Figure 21 shows that from 1964 to 1968, the favorable balance of U.S. trade (exports exceed imports) diminished although it has improved since then. A net favorable balance has been maintained largely because of the technology intensive products.

However, there are other trends which cast doubt upon whether this highly favorable balance of trade in technology intensive items will be retained throughout the 1970's. Figure 22 shows that the net balance of trade of these technology intensive products with Western Europe and Japan has gone down. The United States has become a net importer of such goods from Japan, while in 1963, the United States was a net exporter.

At issue for policy is whether reduced research will ultimately hurt the U.S. balance of payments, and if it seems that it does, what research requires support, at what levels, and toward which industries.

## SELECTIVE WORLD TRADE DATA 1962-1968

ALL COMMODITIES

BILLIONS OF DOLLARS

| | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
|---|---|---|---|---|---|---|---|
| U.S. EXPORTS | 21.4 | 23.1 | 26.2 | 27.2 | 30.0 | 31.2 | 34.2 |
| U.S. IMPORTS | 16.4 | 17.2 | 18.7 | 21.4 | 25.6 | 26.9 | 33.2 |
| BALANCE | 5.0 | 5.9 | 7.5 | 5.8 | 4.4 | 4.3 | 1.0 |

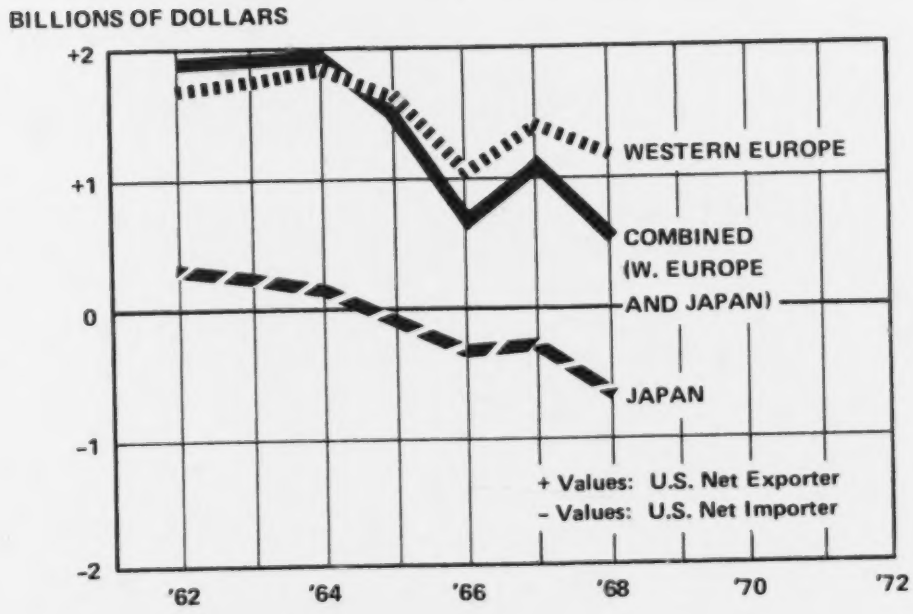
TECHNOLOGY-INTENSIVE PRODUCT

BILLIONS OF DOLLARS

| | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
|---|---|---|---|---|---|---|---|
| U.S. EXPORTS | 10.2 | 10.6 | 12.1 | 13.0 | 14.4 | 16.0 | 18.4 |
| U.S. IMPORTS | 2.5 | 2.6 | 3.1 | 3.9 | 6.0 | 7.0 | 9.4 |
| BALANCE | 7.7 | 8.0 | 9.0 | 9.1 | 8.4 | 9.0 | 9.0 |
| NET BALANCE FOR OTHER THAN TECHNOLOGY INTENSIVE PRODUCTS | (2.7) | (2.1) | (1.5) | (3.3) | (4.0) | (4.6) | (8.0) |

**Figure 21**

## ANNUAL U.S. BALANCE OF TRADE TECHNOLOGY-INTENSIVE PRODUCTS



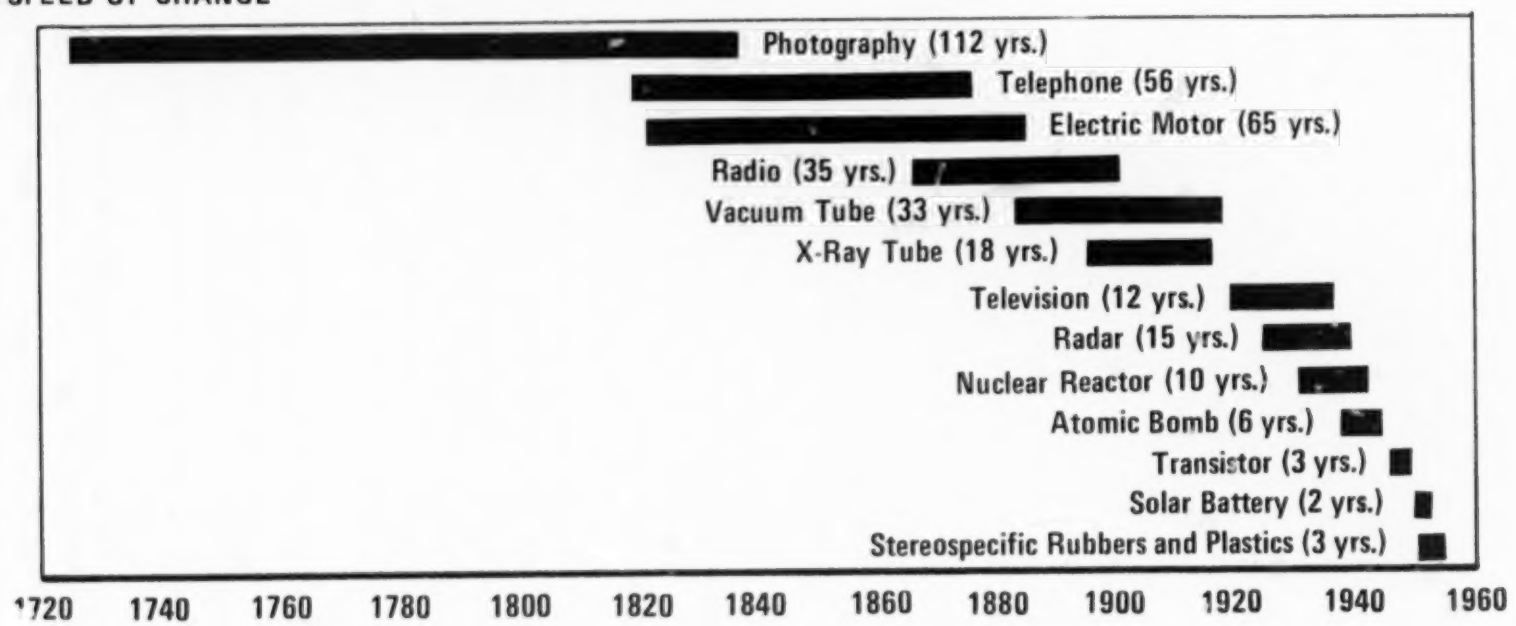

Source: Department of Commerce.

**Figure 22**

The accompanying figure illustrates the increasing rates of change in the time required for technological innovation. Each of these items has had profound social consequences and most of them will continue to have such consequences for years to come. Each example may be characterized as describing a cluster of many discrete scientific and technological developments that together have resulted in new social trends. The impact of the data in figure 23 is that with increasing rapidity knowledge is converted into useful products which produce social change. Hence, the problem of anticipating social change becomes increasingly formidable.

## SELECTIVE ILLUSTRATIONS OF THE SPEED FOR INTRODUCING TECHNICAL DEVELOPMENT INTO SOCIAL USE

**THE SPEED OF CHANGE**




Source: "World Facts and Trends"; Center for Integrative Studies; School of Advanced Technology; State University of New York; Binghamton, N.Y., 1969

Figure 23

## Possible New Trend-Setting Developments of the 1970's

The preceding illustrations have dealt with trends which already are a part of our national life. Present trends are a foundation upon which to begin constructing a view of "alternative futures." As was shown, policy choices made now can substantially change existing trends and start new ones. One cannot plan for the future simply on the assumption that it will evolve just from trends now a part of our life. Many developments in the future—which may or not be foreseeable—will act in unpredictable ways upon present trends. Some of these new developments will generate new trends not yet a part of human experience. Therefore, to obtain a realistic picture of what the future may be, we must go beyond today's realities.

While we cannot know or predict the future, we may be able to approximate its general conditions. Broadly speaking, major new developments do not occur in a single step and simply burst upon society. Rather, such developments are usually convergences of many preceding steps which we can already observe. Therefore, it is possible to conceptualize many likely events of the future and to evaluate their effects upon the quality of life, the fulfillment of present goals, or the stimulation of new goals.

The previous illustrations of projecting from current trends could begin with the various effects of actions or events already in being. If the effects are regarded as important, then the analysis of how they are caused can become a guide to policy choices.

However, to forecast new future trends, one must start with the cause, with the discrete developments that individually or collectively will result in new capabilities and in new effects. This requires an extensive, detailed and continuing analysis. Approaches for doing such an analysis are still crude, but a start has been made. If successfully carried out, this analysis can become an aid to the decisionmaking process. Such analysis is essential if we are to move from a "reactive" to an "anticipatory" mode of policymaking.

Of course any analysis of future developments must be regarded as speculative. Unpredictable breakthroughs from basic science will occur. Other presently familiar technologies such as computers are pregnant with possibilities for major social change as their use is extended and new applications are made.

However, the following are just a few illustrations of developments which many experts now believe will be emerging in the 1970's. These selected developments are not necessarily the most important of those now foreseen. However, they do illustrate, for the purposes of this report, this aspect of "goals research."

## Communication Developments

Communication techniques and tools are likely to change radically during the coming decade. Picture phones, already in limited use, may become widely disseminated. Three-dimensional TV, portable individual telephones, and tape libraries for individual programing of home TV may be in use by 1980. Such changes could have significant impacts on education, government, business, and family life.

Some experts believe that new tools of communication can reduce the need for business travel. Many types of workers may find it increasingly possible to do much of their work at home. This will be particularly true when it becomes economically feasible to connect home facilities with central computers and closed-circuit TV. For example, combining of picture phones, communication satellites, and equipment for reproducing facsimiles of documents and signatures already make it possible for individuals at many different points on the globe to converse face-to-face on a matter, draft final documents, and have signed copies simultaneously.

Significant educational potentials could be opened through audio-visual tapes for home TV sets. Much education might take place outside traditional educational institutions. The cost of "attending" college courses might be greatly reduced, while at the same time the quality of such courses may be raised, since lectures could combine the powerful educational tools of gifted lecturers with graphics and pictures. These changes, if they are employed, would require new institutional arrangements.

## Weather Developments

Steps are being taken to build effective meteorological monitoring systems that will eventually encompass the globe. The combination of satellite technologies, ocean buoys, and computerized weather models may make longer range and more accurate weather forecasting a reality by the end of the decade.

An increasing number of experts feel that some capability for modifying weather could become feasible during the decade. For example, precipitation levels might be increased by modest percentages. Some techniques for fog and smog control could become a reality during the decade. In the longer range future there may be substantial capability for both predicting and modifying weather. Before this capability can be employed, much additional information will be necessary on the effects of weather modification. A risk is associated with the potential that capabilities for beginning weather control might emerge before we have complete information and knowledge about their consequences or have the means to handle these consequences. Should they emerge, such capa-

bilities will raise a number of important policy issues for both domestic and international policies and relationships.

### Possible Ocean Developments

Scientific exploration of the sea is getting seriously underway. Although the resources of the ocean have been used for centuries in various ways, a variety of technological advances of the 1970's may greatly expand the uses of the ocean. These developments in new knowledge may also begin to place constraints on some current uses: for instance, many waste-disposal procedures now use the ocean as the ultimate "sink" (the place where waste is finally deposited). The development of ocean ecology is already beginning to bring information about the effects of these practices upon the pollution of the ocean. The debates over these issues are just beginning to emerge and can be expected to increase during the decade as the consequences of our actions become clear and as new uses of the ocean are developed.

Some forecasters anticipate the development of "ocean farming." At present most food from the ocean comes largely from hunting and gathering rather than careful cultivation, or "aquaculture," but cultivation of the oceans may become significant in future decades just as land cultivation has been in the past.

It is expected that in a decade it will be feasible to do offshore drilling farther from shore and perhaps begin to exploit the ocean floor and the geological resources beneath international waters.

These developments promise to have great impact upon man's source of nutrition, wealth, and recreation.

### Possible Developments in Biological and Health Sciences

The health sciences have shown accelerating change during the past two decades. A number of additional changes appear to be on the horizon and could be coming into use by 1980. An increasing array of human organs could be transplanted as a normal treatment for malfunctioning body processes. Preparations are being made now to adapt legal codes to those new capabilities. A number of State legislatures now are making modifications to their laws that will make it more possible to transplant human organs. The political and social implications of these prospective developments are little understood.

Some experts believe that during the 1970's a number of new capabilities for the influence of learning processes and improving memory through chemical stimulation of various aspects of the neurophysiological processes will be successfully demonstrated. If these developments occur, they will give a variety of new tools for which experience gives little adequate guidance.

Our information on genetics may have progressed by the end of the decade to a more complete understanding of the likely consequences of two partners bearing offspring. What will be society's responsibility to an unborn infant if it can be determined that there is a high chance that the infant, if conceived, will have deformities likely to affect the quality of his existence and greatly increase the cost to society which must provide for him?

Engineering developments promise to provide more and more mechanical organs either to assist in controlling the physiology of the body or perhaps even to replace certain of its vital organs. The forerunners of these new technologies are such things as electronic heart-pacers and the variety of prosthetic devices now in use.

As research on human reproduction processes continues, new forms of fertility control may be developed. Some of these may permit relatively longer term control which could substitute a "shot per year" for a "pill per day."

## Summary

**These are only a few examples of possible developments, many of which have begun or may begin to emerge in the 1970's. Many of these developments may not appear in the 1970's or even later, but the list suggests that, as we view the prospects for our Nation, we must broaden our vision to take into account a variety of developments which will bring many new dimensions to human experience.**

**As illustrated by these selected trends and forecasts, the 1970's promise to be a decade of extraordinary change. Our Nation in 1980 could be one in which cities are more clogged with immovable traffic, air is less breathable, streams polluted to the point where expensive processes will be necessary to get usable water, seashores deteriorating more rapidly, and our people suffering needlessly from having not developed the necessary institutional arrangements for achieving the promise of this decade of change.**

**On the other hand, America in 1980 can be a Nation which will have begun to restore its environment, to have more balanced distribution of regional economic development and of population; a Nation which has abolished hunger and many forms of social inequality and deprivation; and a Nation which will have begun to develop the new social institutions and instruments necessary to turn the promises of this decade of change into reality.**

**If we are to see the second of these possible futures realized in the America of 1980, we must begin now to define what we wish to have as our national goals, and to develop in both our public and private institutions the specific policies and programs which will move us toward those goals.**

## APPENDIX B

### Statement by the President Upon Announcing the Establishment of the National Goals Research Staff

## NATIONAL GOALS RESEARCH STAFF

***Statement by the President Upon Announcing the Establishment of the Staff Within the White House. July 13, 1969***

In seven short years, the United States will celebrate its 200th anniversary as a nation. It is time we addressed ourselves, consciously and systematically, to the question of what kind of a nation we want to be as we begin our third century.

We can no longer afford to approach the longer-range future haphazardly. As the pace of change accelerates, the process of change becomes more complex. Yet at the same time, an extraordinary array of tools and techniques has been developed by which it becomes increasingly possible to project future trends—and thus to make the kind of informed choices which are necessary if we are to establish mastery over the process of change.

These tools and techniques are gaining widespread use in business, and in the social and physical sciences, but they have not been applied systematically and comprehensively to the science of government.

The time is at hand when they should be used, and when they must be used.

Therefore, I have today ordered the establishment, within the White House, of a National Goals Research Staff. This will be a small, highly technical staff, made up of experts in the collection, correlation, and processing of data relating to social needs, and in the projection of social trends. It will operate under the direction of Leonard Garment, Special Consultant to the President, and will maintain a continuous liaison with Dr. Daniel P. Moynihan in his capacity as Executive Secretary of the Council for Urban Affairs, and with Dr. Arthur Burns, Counsellor to the President, in his capacity as head of the Office of Program Development. The functions of the National Goals Research Staff will include:

—forecasting future developments, and assessing the longer-range consequences of present social trends.

—measuring the probable future impact of alternative courses of action, including measuring the degree to which change in one area would be likely to affect another.

—estimating the actual range of social choice—that is, what alternative sets of goals might be attainable, in light of the availability of resources and possible rates of progress.
—developing and monitoring social indicators that can reflect the present and future quality of American life, and the direction and rate of its change.
—summarizing, integrating, and correlating the results of related research activities being carried on within the various Federal agencies, and by State and local governments and private organizations.

I would emphasize several points about this new unit:

—It is not to be a substitute for the many other research activities within the Federal Government; rather, it is intended to help us make better use of the research now being done by bringing together, at one central point, those portions of it that relate directly to future trends and possibilities. It will make accessible what has too often been fragmented.
—It is not to be a "data bank." It might more accurately be referred to as a key element in a management information system. For the first time, it creates within the White House a unit specifically charged with the long perspective; it promises to provide the research tools with which we at last can deal with the future in an informed and informative way.

Since taking office as President, one of my major objectives has been to improve the processes by which our Nation is governed. It has long since become clear that the old ways are no longer adequate, and that much of the old machinery is obsolescent if not obsolete. It also has become clear that one of the principal requirements is for new mechanisms which can enable government to respond to emerging needs early enough so that the response can be effective.

Out of the studies undertaken by the new administration over the past several months, a number of conclusions have emerged that bear directly on the creation of this new unit:

—There are increasing numbers of forecasting efforts in both public and private institutions, which provide a growing body of information upon which to base judgments of probable future developments and of the choices available.
—There is a need to synthesize the results of these efforts, and to analyze the interrelationships of the various kinds of change they represent. The lack of such analysis is a shortcoming of most present forecasting efforts.
—Despite the recent rapid increase of such activity, there are many areas in which a longer-range perspective is still needed.

—There is an urgent need to establish a more direct link between the increasingly sophisticated forecasting now being done, and the decision-making process. The practical importance of establishing such a link is emphasized by the fact that virtually all the critical national problems of today could have been anticipated well in advance of their reaching critical proportions. Even though some were, such anticipation was seldom translated into policy decisions which might have permitted progress to be made in such a way as to avoid—or at least minimize—undesirable longer-range consequences.

—We have reached a state of technological and social development at which the future nature of our society can increasingly be shaped by our own conscious choices. At the same time, those choices are not simple. They require us to pick among alternatives which do not yield to easy, quantitative measurement.

Only by focusing our attention farther into the future can we marshal our resources effectively in the service of those social aims to which we are committed, such as eliminating hunger, cleaning up our environment, providing maximum opportunity for human development during the critical first five years of life, maintaining and improving standards of education and medical care, reducing welfare dependency, and making our cities livable for all.

Only by marshaling the facts can we know how to marshal our resources.

We should expect this look into the future to be both exciting and sobering: exciting, because it will show how great is the reach of the possible; sobering, because it also will show that there are some problems against which the best will in the world can produce only painfully slow progress. The important thing is that we know—that we know both the reach and the limits of what can be done, and the probable consequences, so that our choices can be informed by this knowledge.

The first assignment of this new research group will be to assemble data that can help illumine the possible range of national goals for 1976—our 200th anniversary. It will prepare a public report, to be delivered by July 4 of next year, and annually thereafter, setting forth some of the key choices open to us, and examining the consequences of those choices. It is my hope that this report will then serve as a focus for the kind of lively widespread public discussion that deserves to go into decisions affecting our common future. They key point is this: it will make such discussion possible while there still is time to make the choices effective. Instead of lamenting too late what might have been, it will help give us, as a people, both the luxury and the responsibility of conscious and timely choice.

Only shortly beyond the Nation's 200th anniversary lies the year 2000. These dates, together, can be targets for our aspirations. Our need now is to seize on the future as the key dimension in our decisions, and to chart that future as consciously as we are accustomed to charting the past.

## APPENDIX C

## National Goals Research Staff

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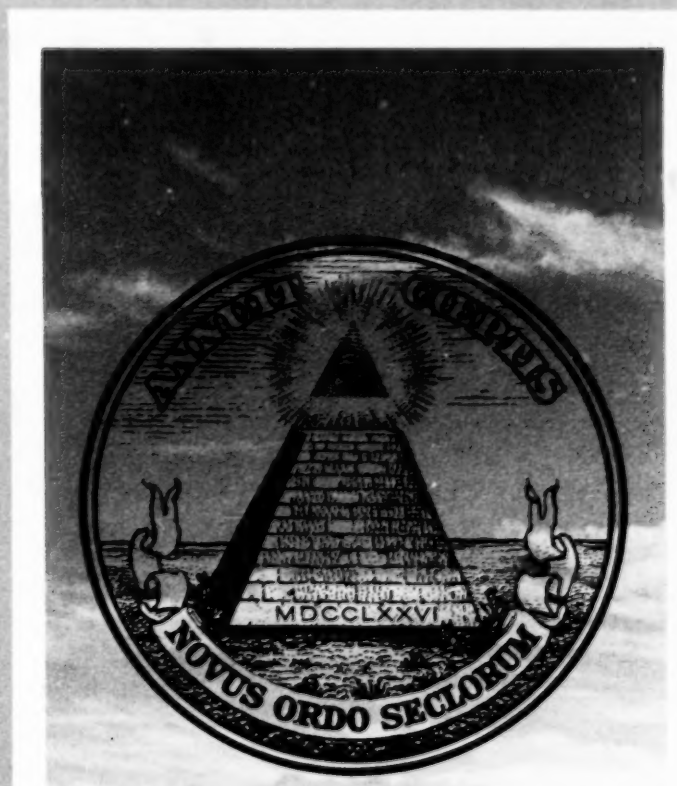
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